

Colorado

Water Supply Outlook Report

March 1, 2017



Scientists collect snowpack data on the Grand Mesa in support of the NASA SnowEx project using both manual sampling techniques and those involving a wide variety of ground based and airborne technologies. SnowEx is a five year collaborative project spearheaded by NASA with a primary goal of improving remote sensing techniques to quantify snow water equivalent across a variety of landscapes. The first year's field campaign involved over 100 scientists and was conducted entirely in Colorado throughout the month of February.

Date: 02/21/2017 Photo By: Karl Wetlaufer

REMINDER: We are soliciting field work photos from our snow surveyors again this year. Each month we will pick one to grace the cover of this report! Please include information on where, when and of who/what the photo was taken.

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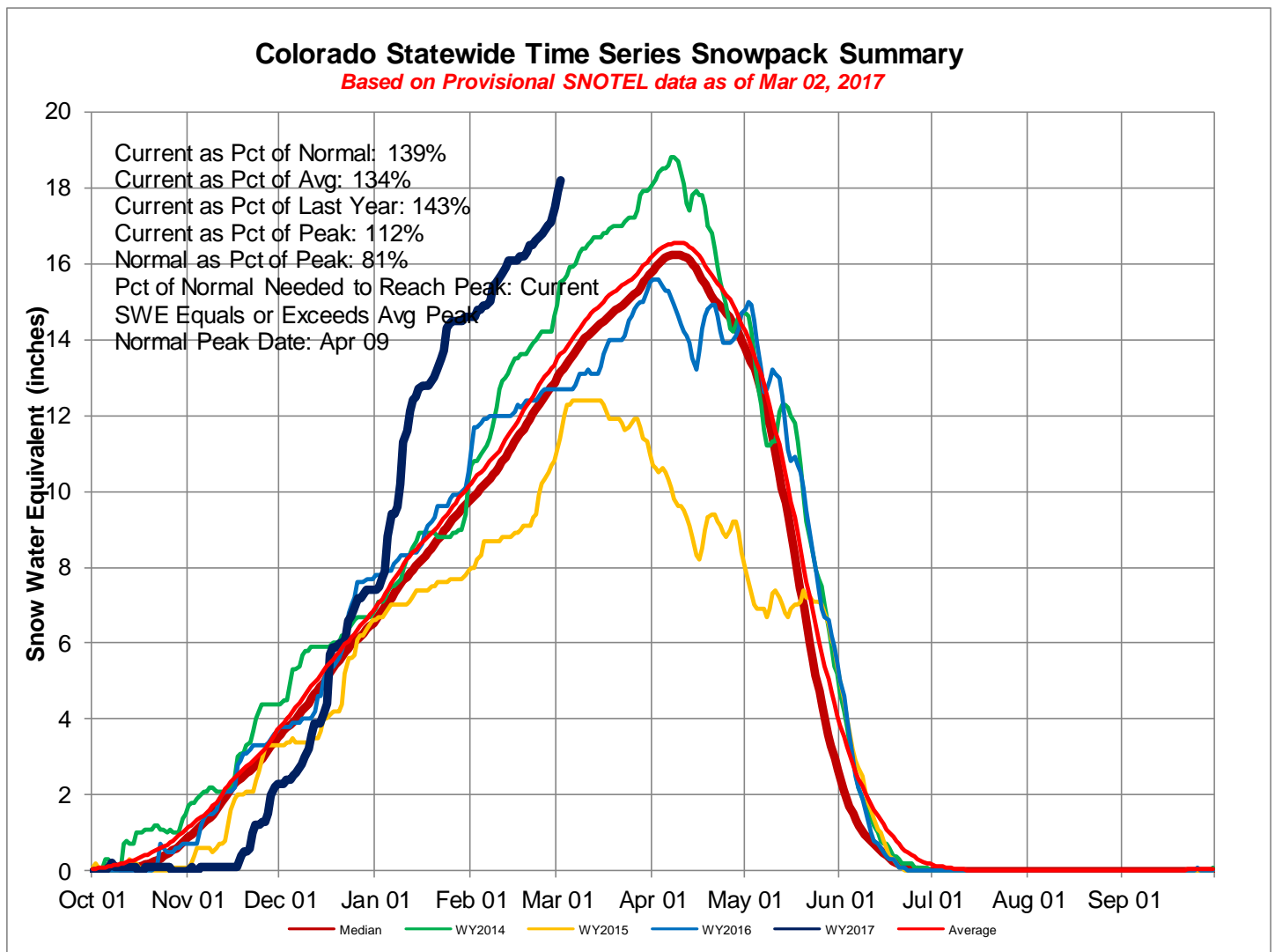
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Statewide Water Supply Conditions

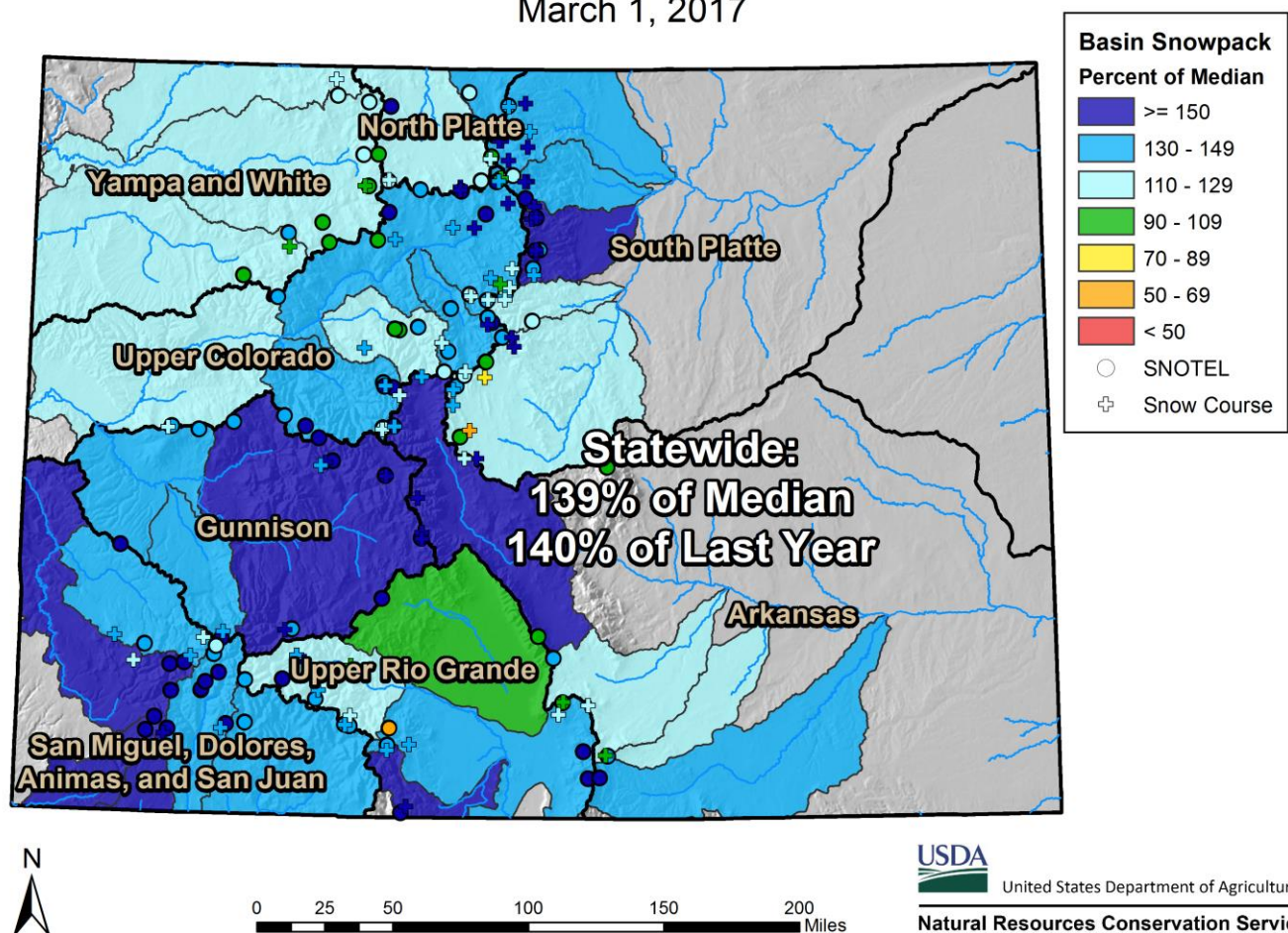
Summary

While February brought substantially less precipitation to Colorado than the previous two months, snowpack and precipitation accumulations were near normal, leaving us with well above normal snow water equivalent (SWE) and water year precipitation amounts. As of March 1st, statewide snowpack was at 139 percent of the 1981-2010 median value. Mountain precipitation across Colorado SNOTEL sites averaged out to be exactly 100 percent of the normal accumulation this February. This forced a drop in the percent of average water year to date precipitation over last month, from 129 to 123 percent, still well above normal values. Reservoir storage experienced a small net gain over the past month across the state, with only the basins of Southwest Colorado experiencing any loss in storage, relative to normal. Statewide reservoir storage is 107 percent of average as of March 1st. The Gunnison River basin which currently holds the most plentiful snowpack in the state also has some of the highest forecasted streamflow volumes in the state. Blue Mesa Reservoir, the largest in Colorado, is forecasted to experience 148 percent (50 percent chance of exceedance) of its average April through July inflow. Streamflow forecasts vary widely across the rest of Colorado but are all for near to well above normal seasonal streamflow volumes, with no current forecasts calling for less than 90 percent of normal volumes.



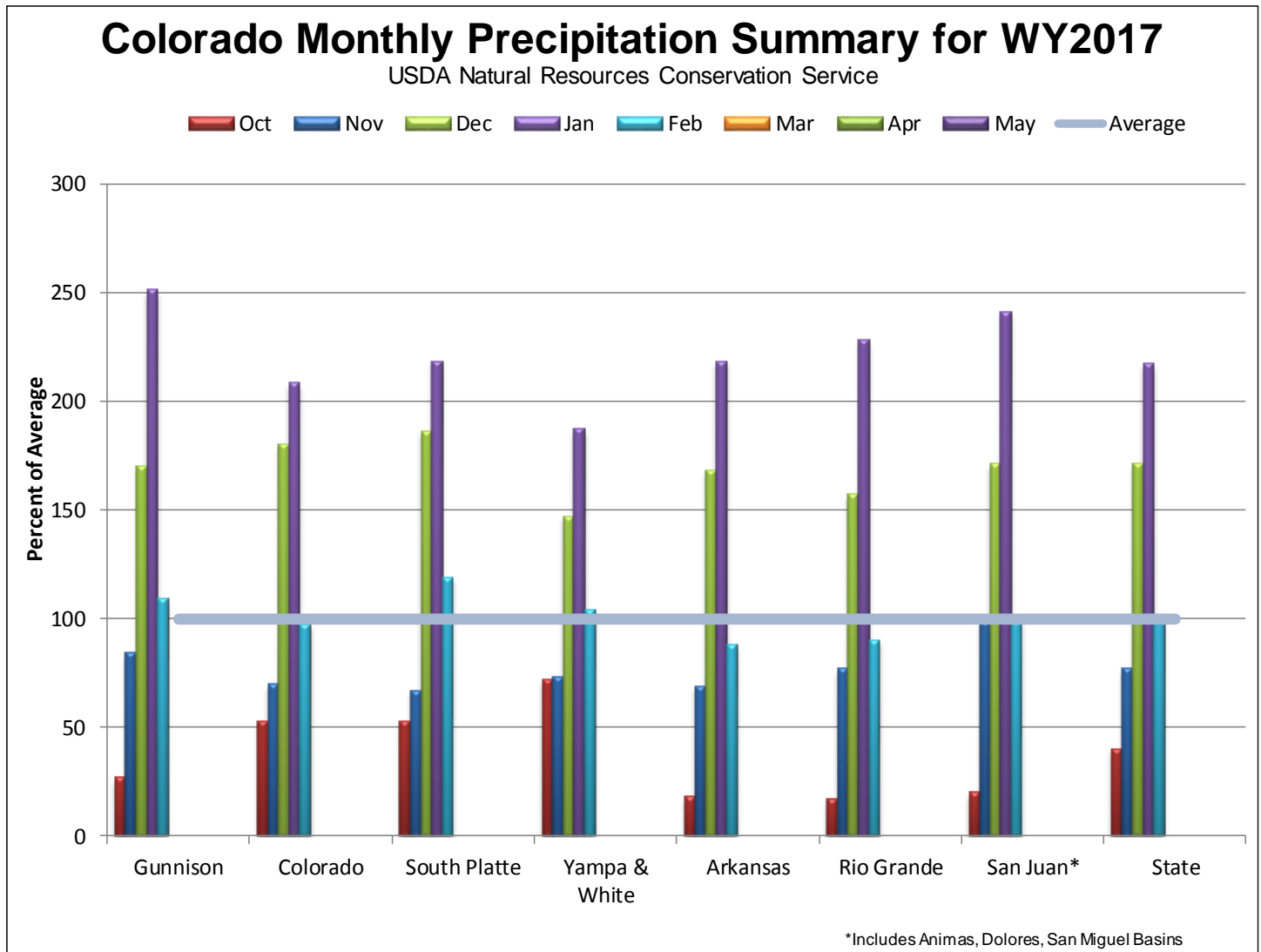
Snowpack

Colorado Monthly Snowpack Summary March 1, 2017



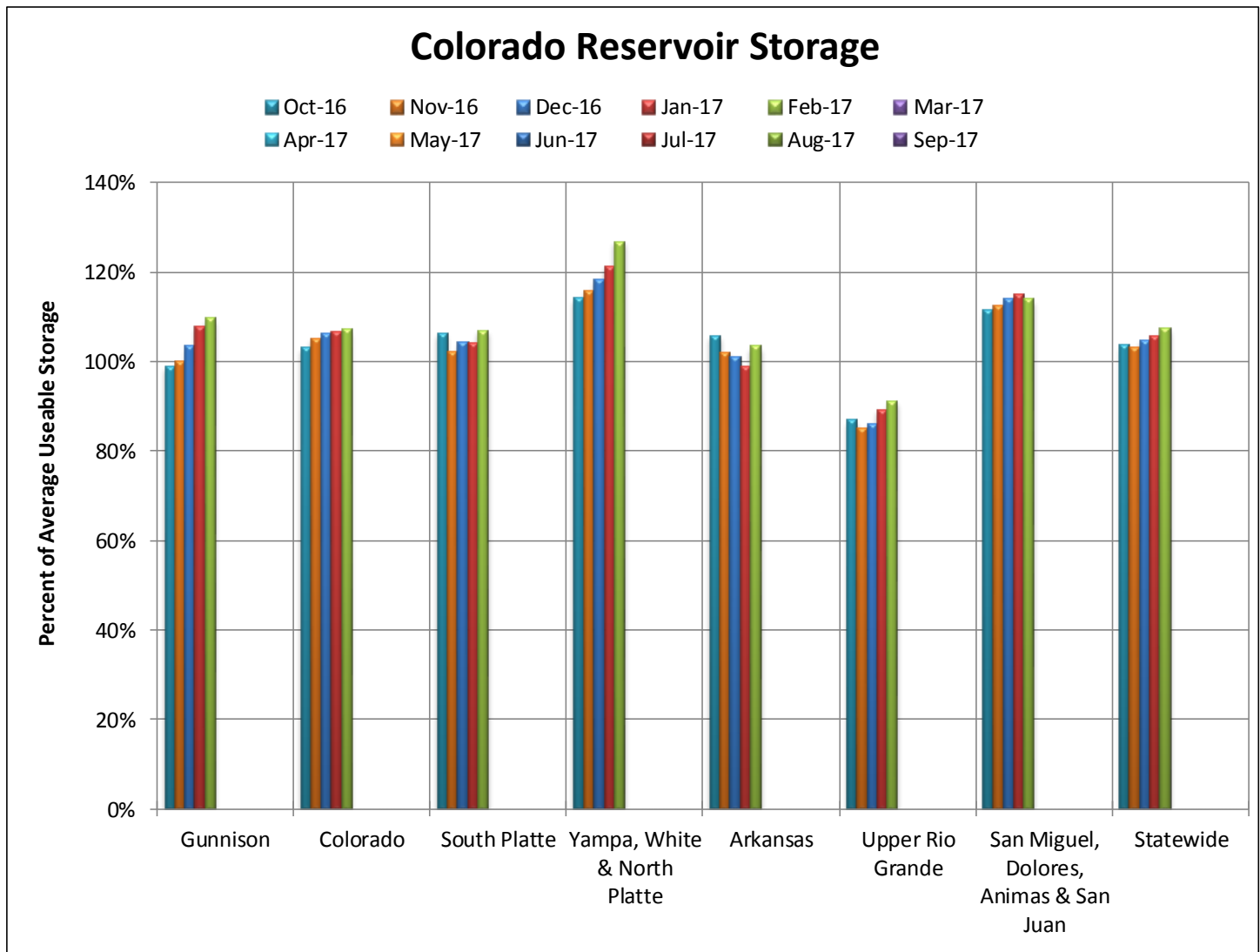
Colorado's snowpack continued to accumulate during February and the statewide snowpack remains well above normal at 139 percent of the median on March 1st. Despite areas that experienced below normal monthly snow accumulations during February and localized periods of unseasonably warm temperatures, the exceptional snowpack that fell during January allowed the mountains to remain at least 120 percent above normal in all areas. Ten SNOTEL sites across the state have record snow water equivalent for March 1st and another five have their second highest snowpack. The Gunnison River basin continues to have the deepest snowpack with respect to normal and is currently at 155 percent of the median. The combined San Miguel, Dolores, Animas, and San Juan basins, the Arkansas River basin, and the South Platte River basin are all above 140 percent of the median, while the Upper Rio Grande and Colorado River basins are both near 135 percent of the median. The combined Yampa, White, and North Platte River basins currently hold the lowest snowpack with respect to normal, but are still at a healthy 126 percent of the median. There is about a month remaining until most of the major river basins typically reach their maximum snow accumulations for the winter. Yet, all areas, except for the South Platte and combined Yampa, White, and North Platte River basins have already exceeded their normal peaks, indicating there will be a plentiful amount of snow available for runoff this spring.

Precipitation



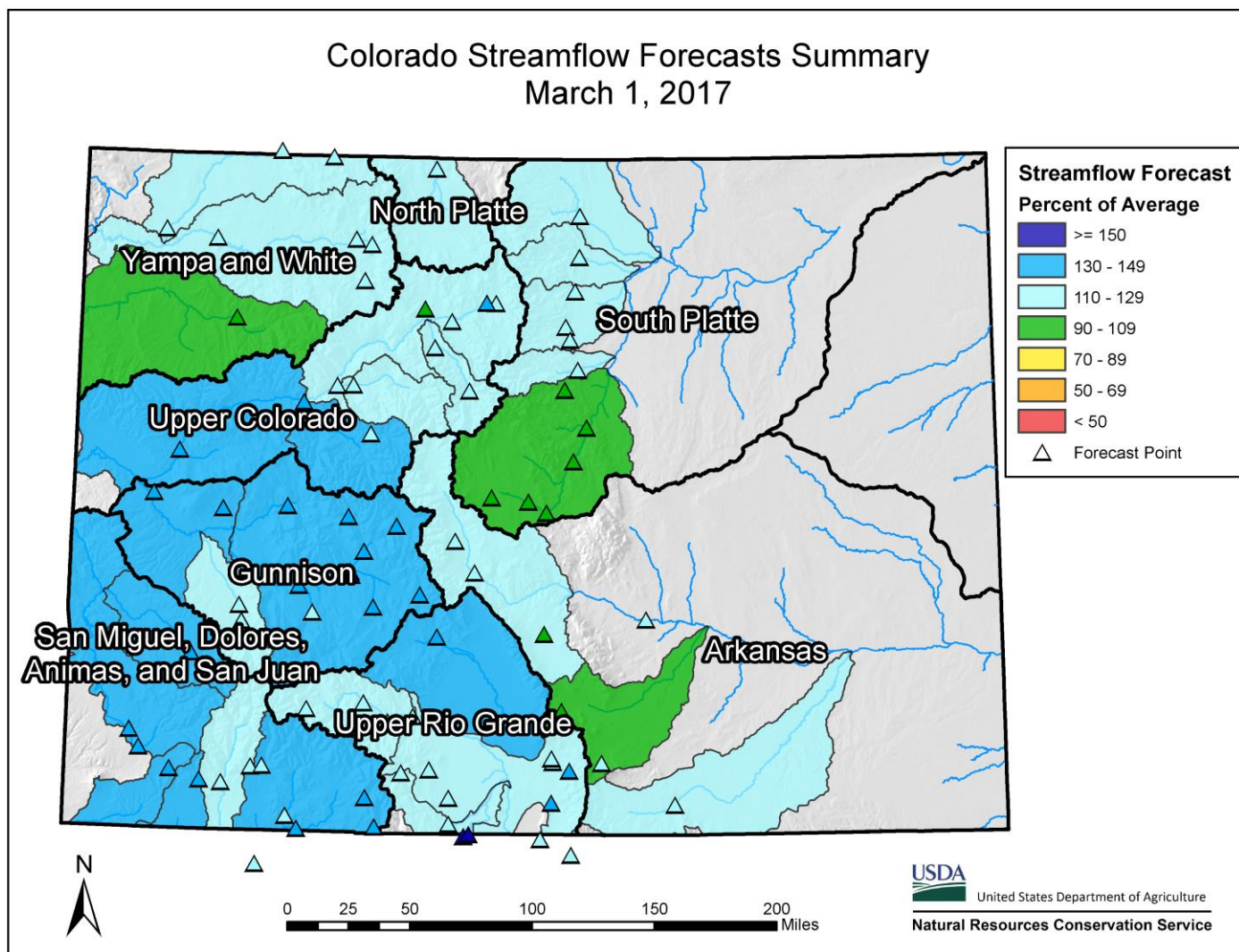
The month of February brought near normal mountain precipitation across the state of Colorado, with the statewide value being exactly 100 percent of the 1981-2010 average. While February precipitation was substantially less than that of the previous two months, it left us with only a six percent drop in water year to date precipitation from last month, which was 123 percent of average as of March 1st. The South Platte basin received the most February precipitation in the state, relative to normal values, at 119 percent of average. This was followed by the Gunnison and combined Yampa, White, and North Platte River basins which received 109 and 104 percent of average precipitation, respectively. The combined San Miguel, Dolores, Animas, and San Juan basins of southwest Colorado came in just below normal, receiving 99 percent of their 1981-2010 average February precipitation. Precipitation in the mountains of the Upper Colorado basin was only slightly behind the Southwest basins and received 97 percent throughout the month. The Upper Rio Grande and Arkansas basins received the least monthly precipitation in the state, relative to their normal amounts, at 90 and 88 percent of average respectively. Even with a few basins coming in below normal for February precipitation, all major basins in the state individually still maintain above average water year to date precipitation. These values range from a low of 111 percent in the Arkansas to highs of 129 percent in the basins of southwest Colorado and 130 percent in both the Gunnison and South Platte basins.

Reservoir Storage



Reservoir storage across Colorado experienced a small net gain between February 1st and March 1st and now resides at 107 percent of average storage for this time of year. Percent of normal storage values range from a low of 91 percent in the upper Rio Grande basin to a high of 127 percent in the combined Yampa, White, and North Platte river basins. While the Upper Rio Grande is still the only major basin in the state to be holding below normal storage values it shows a two percent increase over the previous month. The Arkansas basin has the nearest to normal reservoir storage, holding 103 percent its average value, with all other major basins retaining more water relative to normal amounts. The next highest are the Colorado and South Platte River basins that are both retaining 107 percent of average reservoir storage. The combined San Miguel, Dolores, Animas, and San Juan basins of southwest Colorado were the only in the state to show a drop in reservoir storage relative to their normal amounts, but this only accounted for a one percent change, so very minor overall. These basins now hold 114 percent of average reservoir storage. With one more month of the primary snow accumulation season behind us and above normal snowpacks across the state in combination with these near normal reservoir storages water supply shortages in Colorado are looking less and less likely for the upcoming summer months.

Streamflow



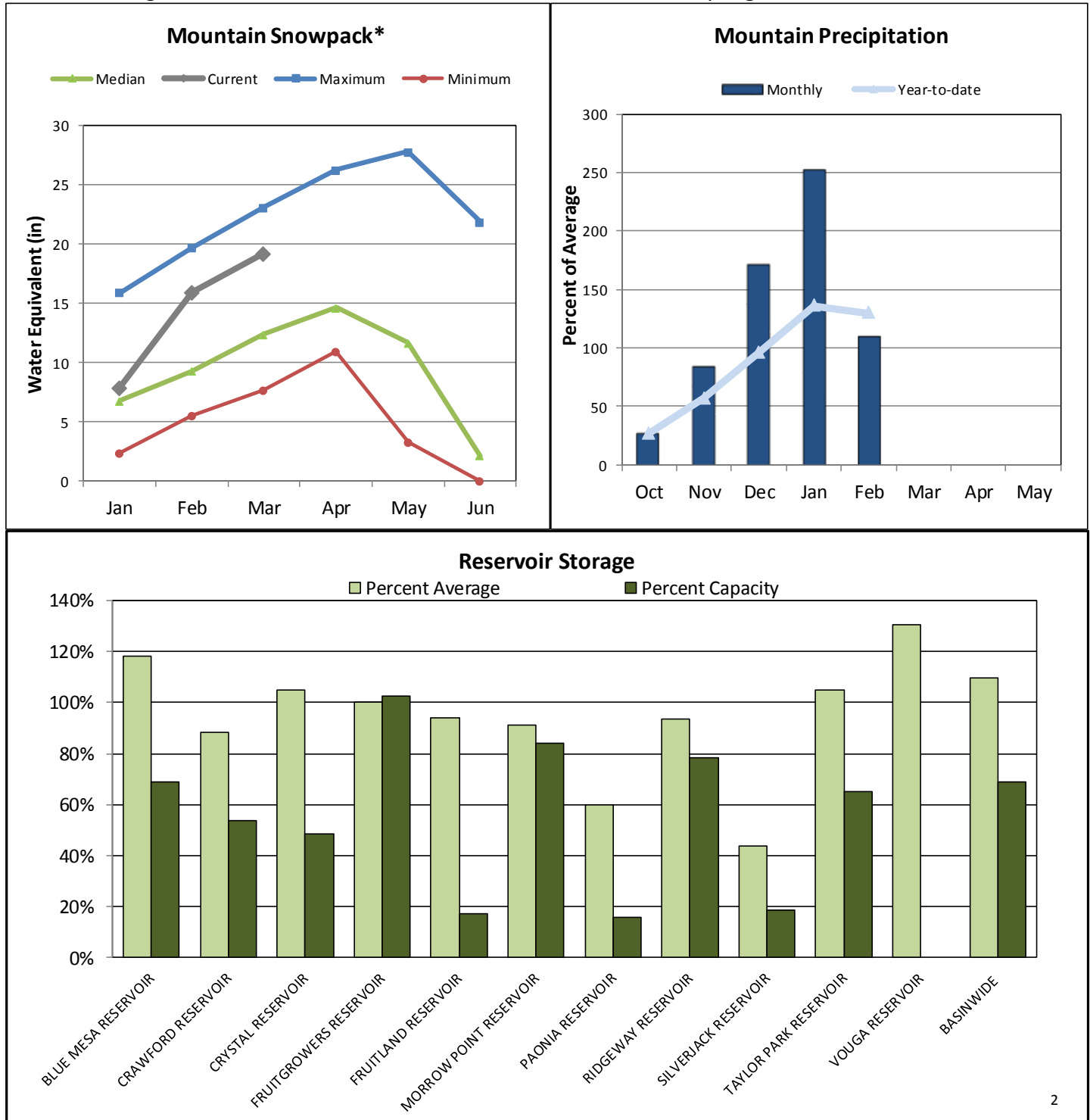
After a drier February relative to previous months, streamflow forecasts on March 1st are slightly lower than those issued last month. However, given the above normal snowpack present in all of the major river basins, streamflow forecasts across the state are generally still above normal. The exceptions are tributaries of the Upper South Platte River basin and the Arkansas River basin, where April-July runoff is now expected to range from slightly below normal (96 and 98 percent of average respectively) to 125 percent of average. Streamflow volumes are projected to be highest, with respect to normal, in the Gunnison River basin where volumes are projected to range from 120 percent to 155 percent of average. There are also areas in the Rio Grande River basin along the New Mexico border with forecasts above 150 percent of average, but in general the basin is expected to have runoff that ranges from 110 to 134 percent of average. Streamflow forecasts are also quite high in the combined San Miguel, Dolores, Animas, and San Juan River basins where April-July runoff volumes are expected to be mostly above 130 percent of average, with a few exceptions in the 110 to 127 percent of average range. Runoff this spring and summer is expected to be between 102 percent and 134 percent of average for the Yampa, White, and North Platte River basins, and between 106 and 130 of average in the Colorado River basin, with the exception of the inflow to Willow Creek Reservoir, which is projected to receive 149 percent of its average runoff. Thanks to the abundant snowfall this water year, 2017 is projected to be the first year since 2008 that the entire state is expected to have above normal April-July streamflow volumes.

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GUNNISON RIVER BASIN

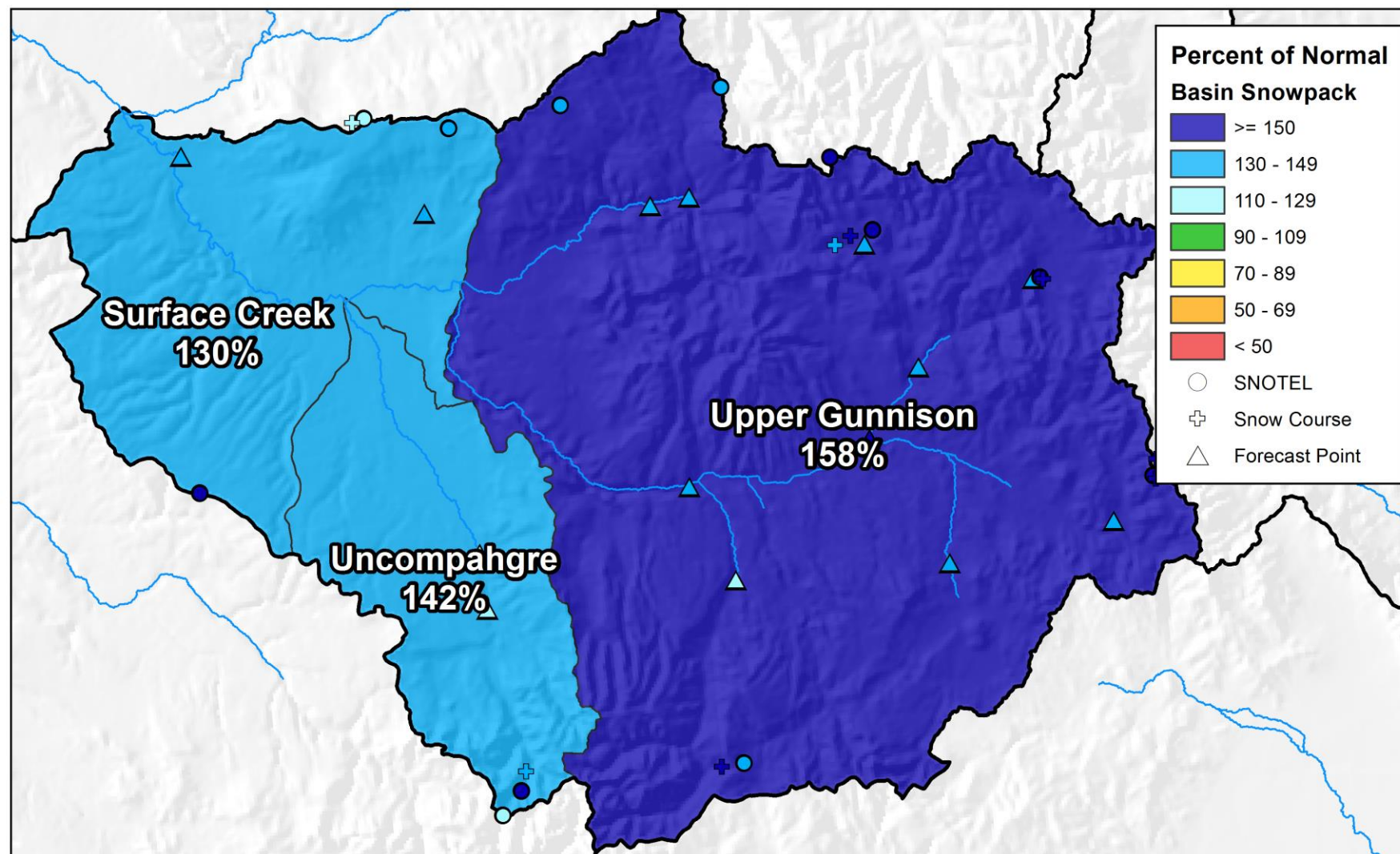
March 1, 2017

Snowpack in the Gunnison River basin is above normal at 155% of the median. Precipitation for February was 109% of average which brings water year-to-date precipitation to 130% of average. Reservoir storage at the end of February was 110% of average compared to 109% last year. Current streamflow forecasts range from 155% of average for Tomichi Creek at Gunnison to 120% for the Uncompahgre River at Colona.



Gunnison River Basin Snowpack and Streamflow Forecasts

March 1, 2017



0 5 10 20 30 40 Miles



United States Department of Agriculture
Natural Resources Conservation Service

Gunnison River Basin

Streamflow Forecasts - March 1, 2017

 Forecast Exceedance Probabilities for Risk Assessment
 Chance that actual volume will exceed forecast

| GUNNISON RIVER BASIN | Forecast Period | 90% (KAF) | 70% (KAF) | 50% (KAF) | % Avg | 30% (KAF) | 10% (KAF) | 30yr Avg (KAF) |
|---|-----------------|-----------|-----------|-----------|-------|-----------|-----------|----------------|
| Taylor Park Reservoir Inflow | APR-JUL | 107 | 126 | 140 | 141% | 155 | 178 | 99 |
| Slate R nr Crested Butte | APR-JUL | 96 | 107 | 115 | 139% | 123 | 136 | 83 |
| East R at Almont | APR-JUL | 220 | 250 | 270 | 148% | 290 | 325 | 182 |
| Gunnison R near Gunnison ² | APR-JUL | 430 | 505 | 560 | 151% | 615 | 705 | 370 |
| Tomichi Ck at Sargents | APR-JUL | 26 | 36 | 43 | 143% | 51 | 64 | 30 |
| Cochetopa Ck bl Rock Ck nr Parlin | APR-JUL | 10.3 | 16.2 | 21 | 140% | 26 | 35 | 15 |
| Tomichi Ck at Gunnison | APR-JUL | 60 | 90 | 115 | 155% | 143 | 188 | 74 |
| Lake Fk at Gateview | APR-JUL | 113 | 138 | 157 | 128% | 177 | 210 | 123 |
| Blue Mesa Reservoir Inflow ² | APR-JUL | 760 | 900 | 1000 | 148% | 1110 | 1270 | 675 |
| Paonia Reservoir Inflow | MAR-JUN | 96 | 118 | 135 | 141% | 153 | 181 | 96 |
| | APR-JUL | 93 | 118 | 137 | 141% | 157 | 190 | 97 |
| NF Gunnison R nr Somerset ² | APR-JUL | 310 | 365 | 400 | 138% | 440 | 500 | 290 |
| Surface Ck at Cedaredge | APR-JUL | 17 | 19.9 | 22 | 131% | 24 | 28 | 16.8 |
| Ridgway Reservoir Inflow | APR-JUL | 87 | 108 | 124 | 123% | 141 | 167 | 101 |
| Uncompahgre R at Colona ² | APR-JUL | 100 | 136 | 164 | 120% | 194 | 245 | 137 |
| Gunnison R nr Grand Junction ² | APR-JUL | 1540 | 1870 | 2110 | 143% | 2370 | 2770 | 1480 |

1) 90% and 10% exceedance probabilities are actually 95% and 5%

2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

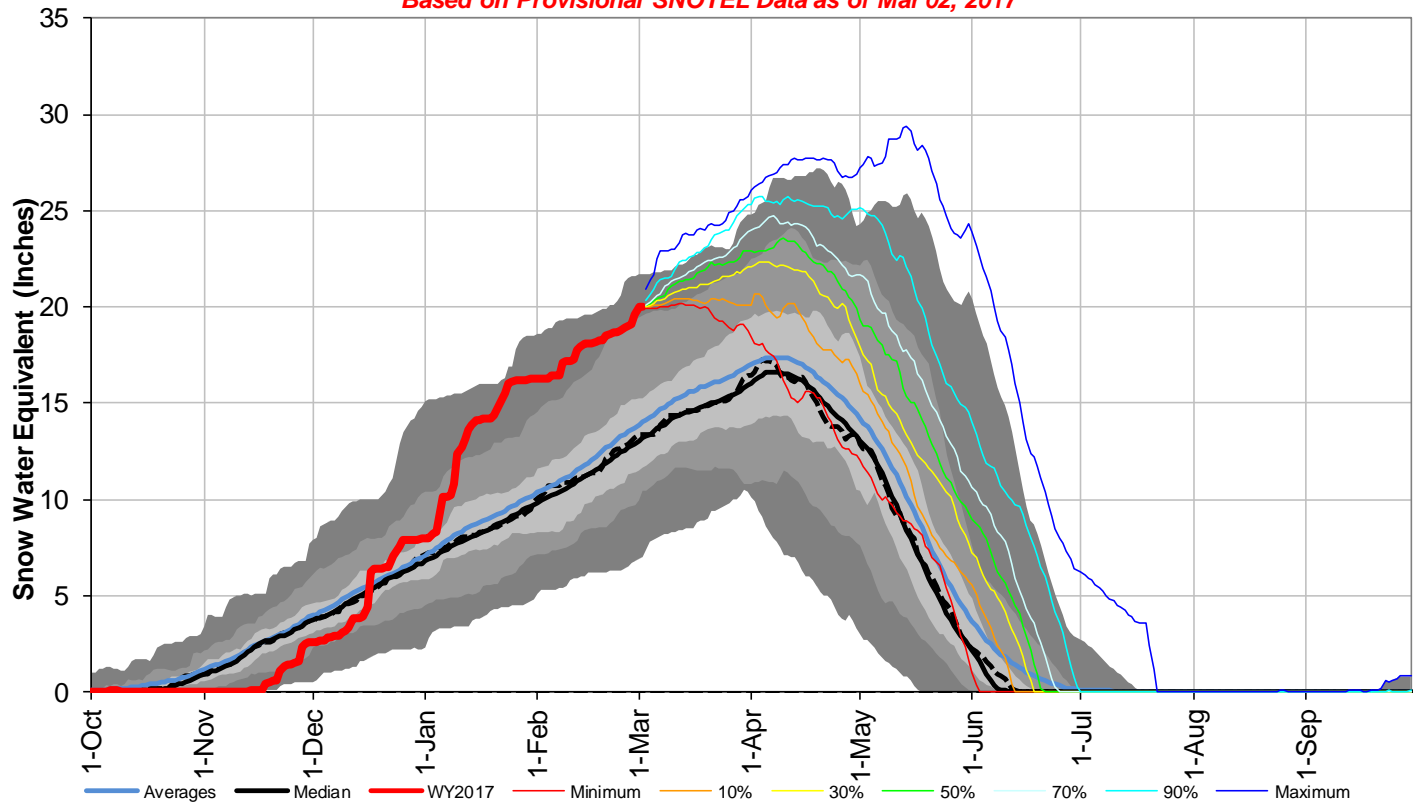
3) Median value used in place of average

| Reservoir Storage End of February, 2017 | Current (KAF) | Last Year (KAF) | Average (KAF) | Capacity (KAF) |
|--|------------------|--------------------|------------------|-------------------|
| Blue Mesa Reservoir | 570.4 | 558.5 | 482.2 | 830.0 |
| Crawford Reservoir | 7.5 | 7.7 | 8.5 | 14.0 |
| Crystal Reservoir | 8.5 | 9.1 | 8.1 | 17.5 |
| Fruitgrowers Reservoir | 3.7 | 3.4 | 3.7 | 3.6 |
| Fruitland Reservoir | 1.6 | 1.9 | 1.7 | 9.2 |
| Morrow Point Reservoir | 101.6 | 108.1 | 111.1 | 121.0 |
| Paonia Reservoir | 2.4 | 1.2 | 4.0 | 15.4 |
| Ridgway Reservoir | 65.0 | 65.4 | 69.4 | 83.0 |
| Silverjack Reservoir | 2.4 | 4.5 | 5.5 | 12.8 |
| Taylor Park Reservoir | 69.0 | 68.4 | 65.7 | 106.0 |
| Vouga Reservoir | 0.9 | 0.9 | 0.7 | 0.9 |
| Basin-wide Total | 833.0 | 829.1 | 760.6 | 1213.4 |
| # of reservoirs | 11 | 11 | 11 | 11 |

| Watershed Snowpack Analysis March 1, 2017 | # of Sites | % Median | Last Year % Median |
|--|------------|----------|-----------------------|
| UPPER GUNNISON BASIN | 17 | 158% | 96% |
| SURFACE CREEK BASIN | 3 | 130% | 101% |
| UNCOMPAHGRE BASIN | 4 | 142% | 111% |
| GUNNISON RIVER BASIN | 21 | 155% | 99% |

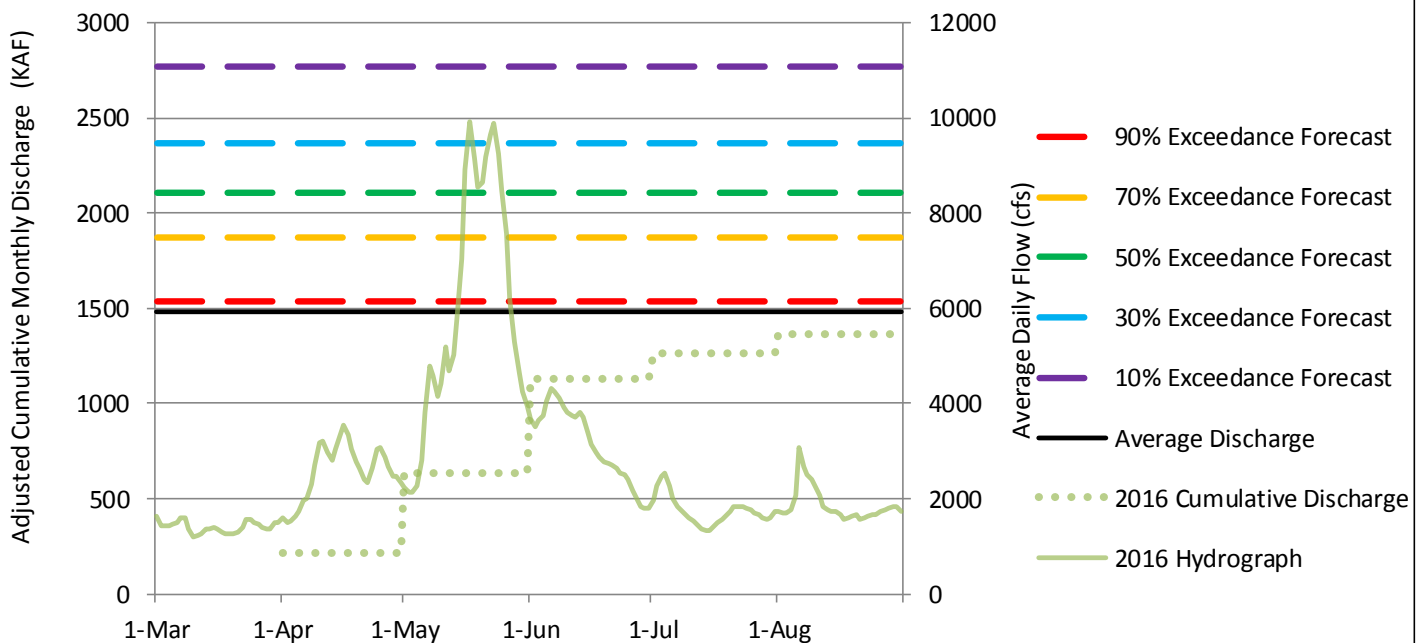
Gunnison River Basin with Non-Exceedence Projections

Based on Provisional SNOTEL Data as of Mar 02, 2017



Gunnison River near Grand Junction, CO

Daily and Cumulative Discharge Compared to Current Streamflow Forecasts (Apr - Jul)

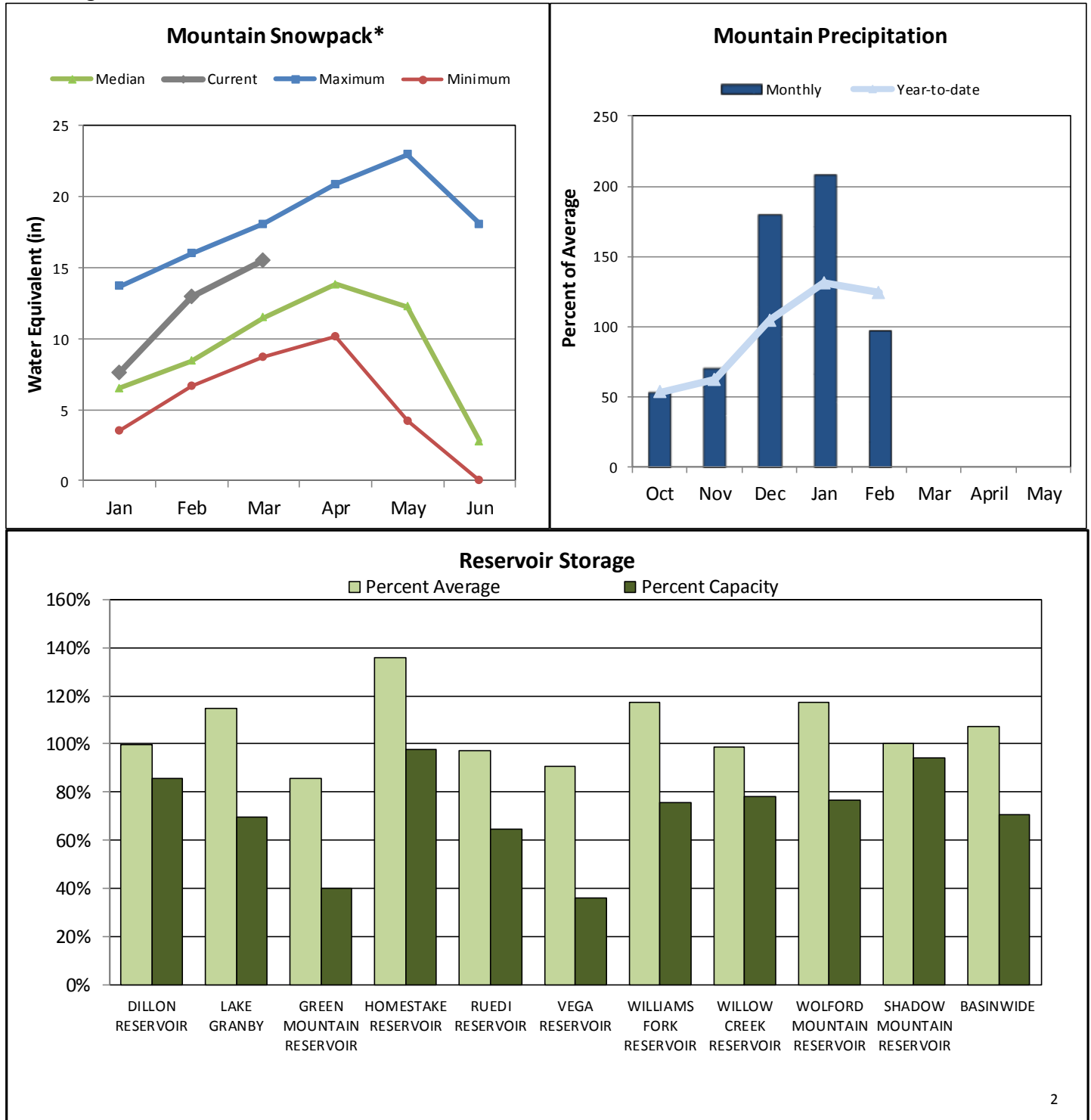


Please refer to the sections at the end of this report for further explanation concerning these graphs.

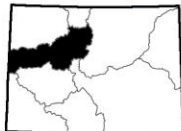
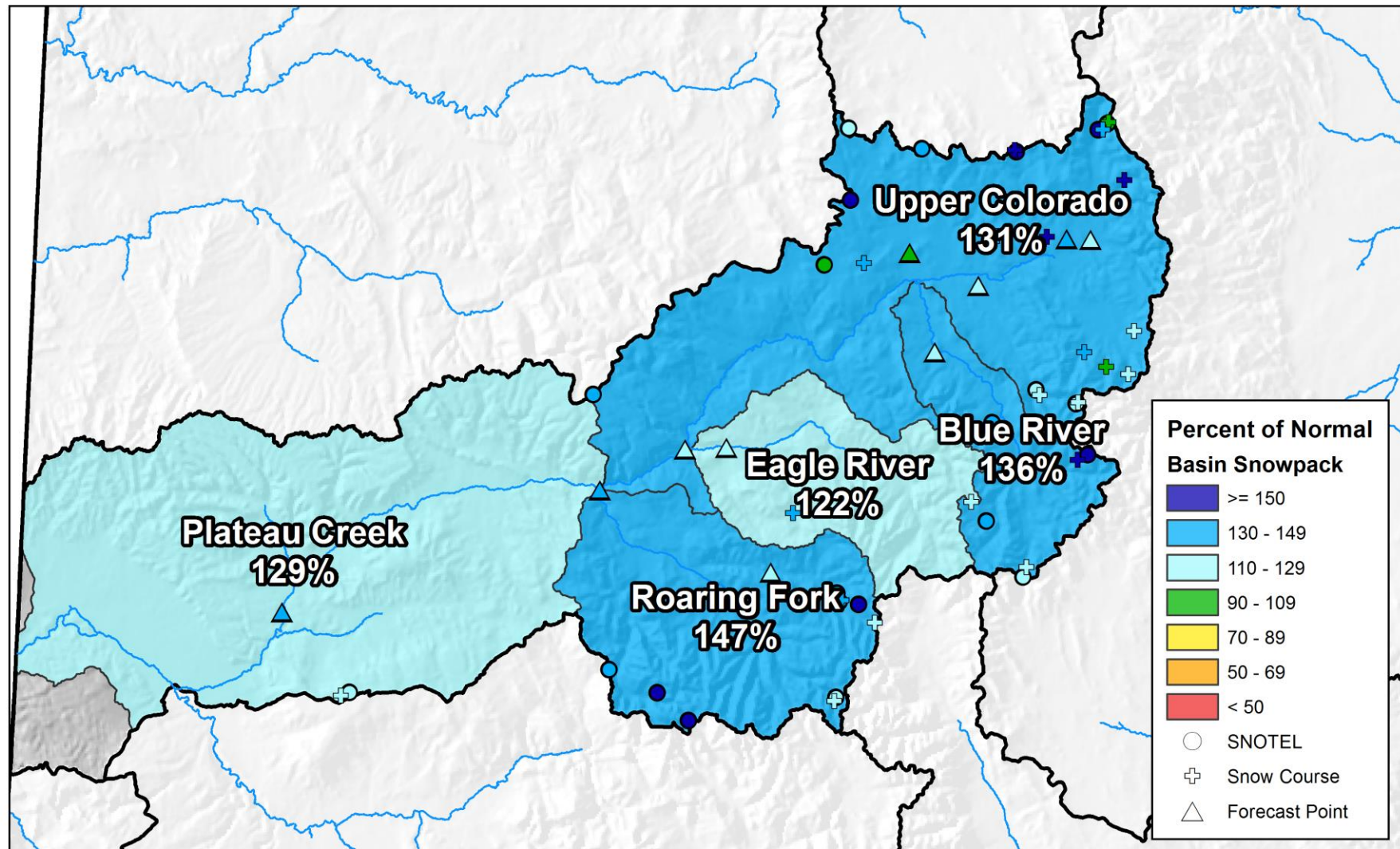
UPPER COLORADO RIVER BASIN

March 1, 2017

Snowpack in the Colorado River basin is above normal at 135% of the median. Precipitation for February was 97% of average which brings water year-to-date precipitation to 124% of average. Reservoir storage at the end of February was 107% of average compared to 110% last year. Current streamflow forecasts range from 149% of average for the inflow to Willow Creek Reservoir to 106% for the Wolford Mountain Reservoir inflow.



Upper Colorado River Basin Snowpack and Streamflow Forecasts March 1, 2017



0 5 10 20 30 40
Miles



United States Department of Agriculture

Natural Resources Conservation Service

Upper Colorado River Basin Streamflow Forecasts - March 1, 2017

 Forecast Exceedance Probabilities for Risk Assessment
 Chance that actual volume will exceed forecast

| UPPER COLORADO RIVER BASIN | Forecast Period | 90% (KAF) | 70% (KAF) | 50% (KAF) | % Avg | 30% (KAF) | 10% (KAF) | 30yr Avg (KAF) |
|---|-----------------|-----------|-----------|-----------|-------|-----------|-----------|----------------|
| Lake Granby Inflow ² | APR-JUL | 196 | 235 | 265 | 120% | 295 | 345 | 220 |
| Willow Ck Reservoir Inflow | APR-JUL | 46 | 60 | 70 | 149% | 81 | 98 | 47 |
| Williams Fk bl Williams Fk Reservoir ² | APR-JUL | 90 | 110 | 125 | 129% | 141 | 166 | 97 |
| Wolford Mtn Reservoir Inflow | APR-JUL | 38 | 49 | 57 | 106% | 66 | 80 | 54 |
| Dillon Reservoir Inflow ² | APR-JUL | 150 | 182 | 205 | 126% | 230 | 270 | 163 |
| Green Mountain Reservoir Inflow ² | APR-JUL | 250 | 305 | 345 | 125% | 385 | 455 | 275 |
| Eagle R bl Gypsum ² | APR-JUL | 280 | 340 | 385 | 115% | 435 | 510 | 335 |
| Colorado R nr Dotsero ² | APR-JUL | 1250 | 1540 | 1760 | 126% | 1990 | 2360 | 1400 |
| Ruedi Reservoir Inflow ² | APR-JUL | 122 | 146 | 163 | 117% | 181 | 210 | 139 |
| Roaring Fk at Glenwood Springs ² | APR-JUL | 715 | 820 | 900 | 130% | 980 | 1110 | 690 |
| Colorado R nr Cameo ² | APR-JUL | 2370 | 2770 | 3060 | 130% | 3360 | 3830 | 2350 |

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2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

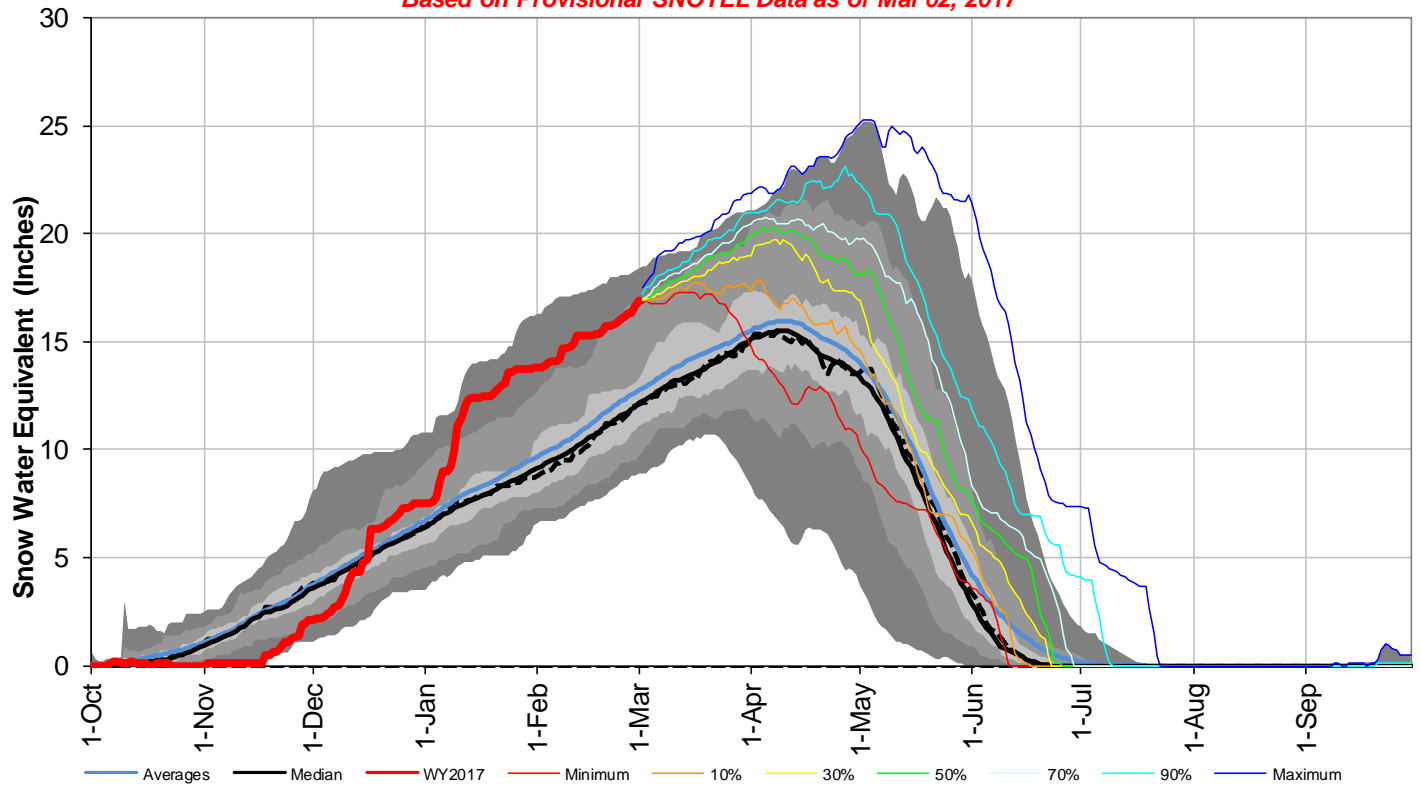
3) Median value used in place of average

| Reservoir Storage End of February, 2017 | Current (KAF) | Last Year (KAF) | Average (KAF) | Capacity (KAF) |
|--|---------------|-----------------|---------------|----------------|
| Dillon Reservoir | 213.6 | 231.7 | 214.5 | 249.1 |
| Green Mountain Reservoir | 59.0 | 59.0 | 68.7 | 146.8 |
| Homestake Reservoir | 42.1 | 41.2 | 31.0 | 43.0 |
| Lake Granby | 324.4 | 333.7 | 282.6 | 465.6 |
| Ruedi Reservoir | 66.0 | 68.6 | 67.9 | 102.0 |
| Shadow Mountain Reservoir | 17.3 | 17.4 | 17.3 | 18.4 |
| Vega Reservoir | 11.9 | 12.0 | 13.1 | 32.9 |
| Williams Fork Reservoir | 73.2 | 76.7 | 62.4 | 97.0 |
| Willow Creek Reservoir | 7.1 | 7.2 | 7.2 | 9.1 |
| Wolford Mountain Reservoir | 50.6 | 42.1 | 43.2 | 65.9 |
| Basin-wide Total | 865.2 | 889.6 | 807.9 | 1229.8 |
| # of reservoirs | 10 | 10 | 10 | 10 |

| Watershed Snowpack Analysis March 1, 2017 | # of Sites | % Median | Last Year % Median |
|--|------------|----------|--------------------|
| BLUE RIVER BASIN | 8 | 136% | 101% |
| HEADWATERS COLORADO RIVER | 36 | 131% | 100% |
| MUDDY CREEK BASIN | 5 | 134% | 104% |
| EAGLE RIVER BASIN | 5 | 122% | 93% |
| PLATEAU CREEK BASIN | 3 | 130% | 101% |
| ROARING FORK BASIN | 10 | 147% | 96% |
| WILLIAMS FORK BASIN | 5 | 118% | 108% |
| WILLOW CREEK BASIN | 5 | 167% | 104% |
| UPPER COLORADO RIVER BASIN | 49 | 135% | 99% |

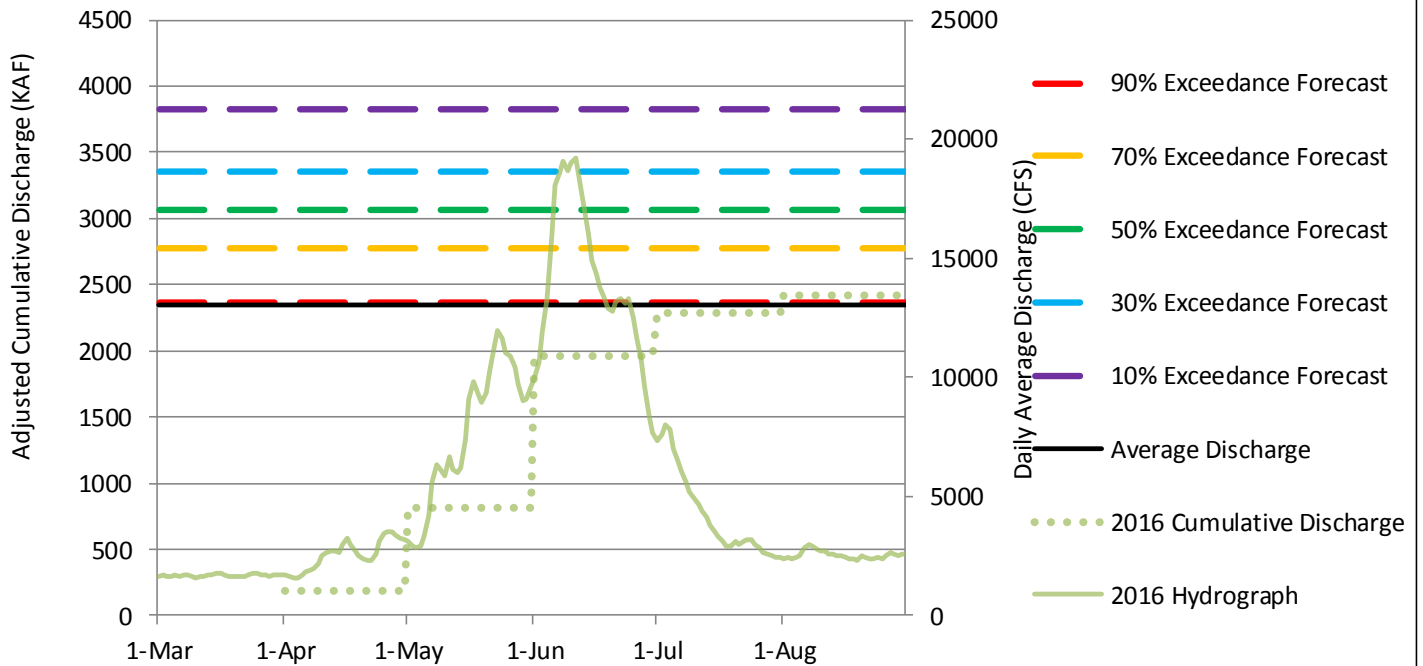
Upper Colorado River Basin with Non-Exceedance Projections

Based on Provisional SNOTEL Data as of Mar 02, 2017



Colorado River near Cameo, CO

Daily and Cumulative Discharge Compared to Current Streamflow Forecasts (Apr - Jul)

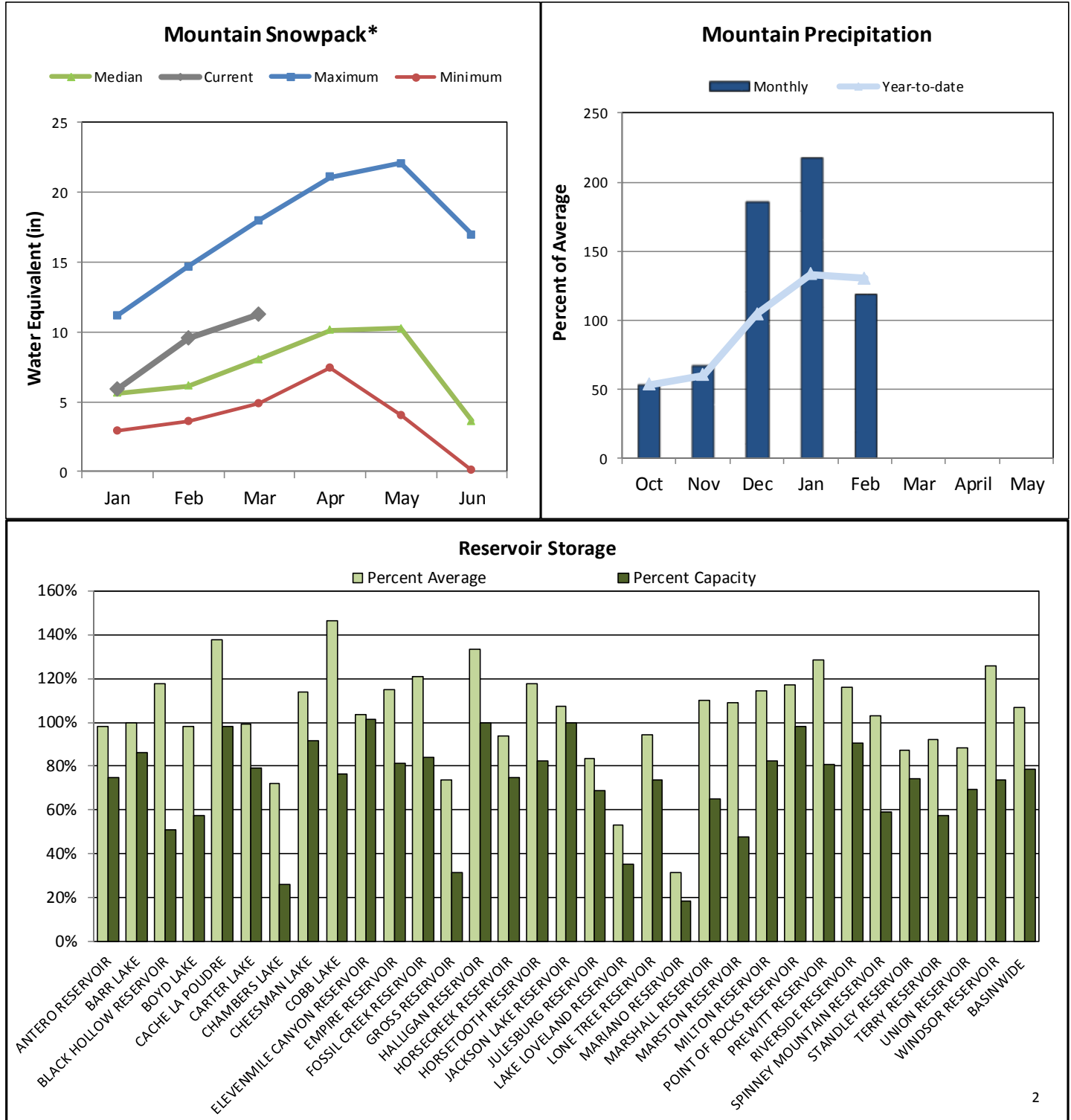


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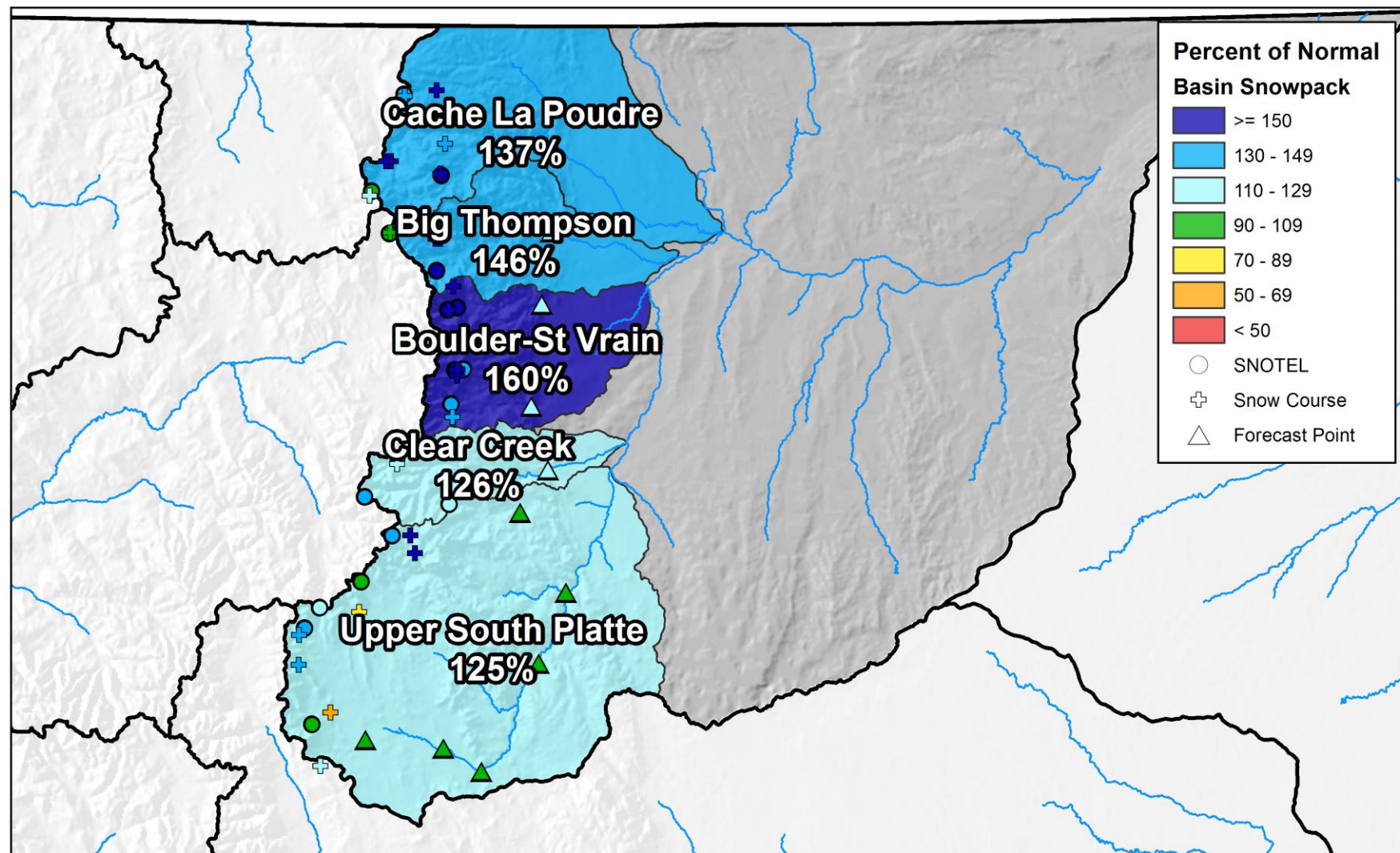
SOUTH PLATTE RIVER BASIN

March 1, 2017

Snowpack in the South Platte River basin is above normal at 140% of the median. Precipitation for February was 119% of average which brings water year-to-date precipitation to 130%. Reservoir storage at the end of February was 107% of average, the same as last year. Streamflow forecasts range from 125% of average for St. Vrain Creek at Lyons to 96% for the inflows to Antero Reservoir and Cheesman Lake.



South Platte River Basin Snowpack and Streamflow Forecasts March 1, 2017



0 10 20 40 60 80 Miles



United States Department of Agriculture

Natural Resources Conservation Service

South Platte River Basin Streamflow Forecasts - March 1, 2017

 Forecast Exceedance Probabilities for Risk Assessment
 Chance that actual volume will exceed forecast

| SOUTH PLATTE RIVER BASIN | Forecast Period | 90% (KAF) | 70% (KAF) | 50% (KAF) | % Avg | 30% (KAF) | 10% (KAF) | 30yr Avg (KAF) |
|---|-----------------|-----------|-----------|-----------|-------|-----------|-----------|----------------|
| Antero Reservoir Inflow ² | APR-JUL | 7.7 | 11.4 | 13.9 | 96% | 16.3 | 20 | 14.5 |
| | APR-SEP | 9.6 | 13.8 | 16.6 | 93% | 19.4 | 24 | 17.8 |
| Spinney Mountain Reservoir Inflow ² | APR-JUL | 31 | 42 | 49 | 102% | 56 | 67 | 48 |
| | APR-SEP | 39 | 52 | 61 | 100% | 70 | 84 | 61 |
| Elevenmile Canyon Reservoir Inflow ² | APR-JUL | 31 | 43 | 50 | 100% | 58 | 69 | 50 |
| | APR-SEP | 40 | 54 | 64 | 100% | 73 | 87 | 64 |
| Cheesman Lake Inflow ² | APR-JUL | 63 | 83 | 96 | 96% | 110 | 130 | 100 |
| | APR-SEP | 79 | 104 | 121 | 96% | 138 | 163 | 126 |
| South Platte R at South Platte ² | APR-JUL | 118 | 159 | 187 | 104% | 215 | 255 | 180 |
| | APR-SEP | 147 | 197 | 230 | 102% | 265 | 315 | 225 |
| Bear Ck ab Evergreen | APR-JUL | 8.4 | 13.1 | 16.2 | 99% | 19.4 | 24 | 16.4 |
| | APR-SEP | 12 | 17.4 | 21 | 100% | 25 | 30 | 21 |
| Clear Ck at Golden | APR-JUL | 95 | 112 | 123 | 117% | 134 | 151 | 105 |
| | APR-SEP | 110 | 133 | 148 | 116% | 164 | 186 | 128 |
| St. Vrain Ck at Lyons ² | APR-JUL | 83 | 99 | 110 | 125% | 121 | 137 | 88 |
| | APR-SEP | 97 | 116 | 130 | 126% | 143 | 162 | 103 |
| Boulder Ck nr Orodell ² | APR-JUL | 47 | 56 | 62 | 115% | 68 | 77 | 54 |
| | APR-SEP | 53 | 64 | 72 | 114% | 79 | 90 | 63 |
| South Boulder Ck nr Eldorado Springs ² | APR-JUL | 31 | 38 | 43 | 110% | 48 | 55 | 39 |
| | APR-SEP | 33 | 41 | 47 | 109% | 53 | 61 | 43 |
| Big Thompson R at Canyon Mouth ² | APR-JUL | 77 | 94 | 106 | 118% | 117 | 134 | 90 |
| | APR-SEP | 87 | 110 | 125 | 117% | 140 | 162 | 107 |
| Cache La Poudre at Canyon Mouth ² | APR-JUL | 180 | 230 | 265 | 118% | 300 | 350 | 225 |
| | APR-SEP | 194 | 250 | 290 | 116% | 330 | 385 | 250 |

1) 90% and 10% exceedance probabilities are actually 95% and 5%

2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

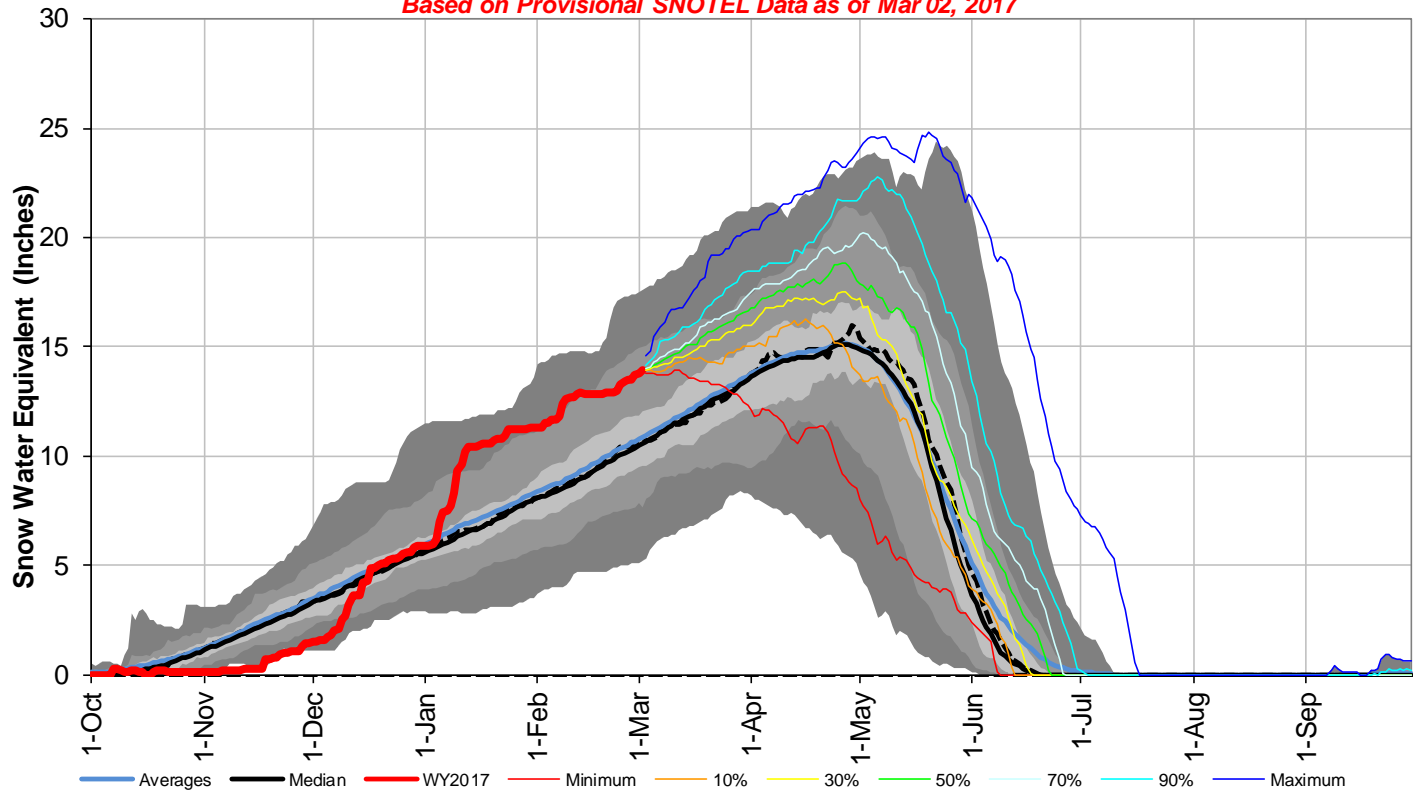
3) Median value used in place of average

| Reservoir Storage End of February, 2017 | Current (KAF) | Last Year (KAF) | Average (KAF) | Capacity (KAF) |
|--|------------------|--------------------|------------------|-------------------|
| Antero Reservoir | 14.9 | 0.0 | 15.2 | 19.9 |
| Barr Lake | 26.0 | 26.9 | 26.0 | 30.1 |
| Black Hollow Reservoir | 3.3 | 3.0 | 2.8 | 6.5 |
| Boyd Lake | 27.7 | 35.3 | 28.2 | 48.4 |
| Cache La Poudre | 9.9 | 8.9 | 7.2 | 10.1 |
| Carter Lake | 86.3 | 88.5 | 87.0 | 108.9 |
| Chambers Lake | 2.3 | 3.9 | 3.2 | 8.8 |
| Cheesman Lake | 72.2 | 69.9 | 63.4 | 79.0 |
| Cobb Lake | 17.0 | 18.6 | 11.6 | 22.3 |
| Elevenmile Canyon Reservoir | 99.3 | 99.5 | 95.8 | 98.0 |
| Empire Reservoir | 29.7 | 30.6 | 25.9 | 36.5 |
| Fossil Creek Reservoir | 9.3 | 9.1 | 7.7 | 11.1 |
| Gross Reservoir | 9.4 | 12.8 | 12.8 | 29.8 |
| Halligan Reservoir | 6.4 | 6.4 | 4.8 | 6.4 |
| Horseshoe Reservoir | 11.0 | 9.5 | 11.7 | 14.7 |
| Horseshoe Reservoir | 123.1 | 114.0 | 104.8 | 149.7 |
| Jackson Lake Reservoir | 26.0 | 24.0 | 24.2 | 26.1 |
| Julesburg Reservoir | 14.1 | 15.7 | 16.9 | 20.5 |
| Lake Loveland Reservoir | 3.6 | 0.5 | 6.8 | 10.3 |
| Lone Tree Reservoir | 6.4 | 7.0 | 6.8 | 8.7 |
| Mariano Reservoir | 1.0 | 2.2 | 3.2 | 5.4 |
| Marshall Reservoir | 6.5 | 7.5 | 5.9 | 10.0 |
| Marston Reservoir | 6.2 | 9.5 | 5.7 | 13.0 |
| Milton Reservoir | 19.4 | 19.4 | 17.0 | 23.5 |
| Point Of Rocks Reservoir | 69.3 | 65.3 | 59.2 | 70.6 |
| Prewitt Reservoir | 22.7 | 16.2 | 17.7 | 28.2 |
| Ralph Price Reservoir | 10.9 | 12.2 | 16.2 | 16.2 |
| Riverside Reservoir | 50.4 | 51.7 | 43.5 | 55.8 |
| Spinney Mountain Reservoir | 29.0 | 30.6 | 28.1 | 49.0 |
| Standley Reservoir | 31.1 | 38.8 | 35.7 | 42.0 |
| Terry Reservoir | 4.6 | 5.7 | 5.0 | 8.0 |
| Union Reservoir | 9.0 | 12.1 | 10.2 | 13.0 |
| Windsor Reservoir | 11.2 | 0.4 | 8.9 | 15.2 |
| Basin-wide Total | 858.3 | 843.5 | 802.9 | 1079.5 |
| # of reservoirs | 32 | 32 | 32 | 32 |

| Watershed Snowpack Analysis March 1, 2017 | # of Sites | % Median | Last Year % Median |
|--|------------|----------|-----------------------|
| BIG THOMPSON BASIN | 7 | 146% | 94% |
| BOULDER CREEK BASIN | 6 | 155% | 111% |
| CACHE LA POUDE BASIN | 10 | 137% | 97% |
| CLEAR CREEK BASIN | 4 | 126% | 104% |
| SAINT VRAIN BASIN | 3 | 200% | 102% |
| UPPER SOUTH PLATTE BASIN | 16 | 125% | 110% |
| SOUTH PLATTE RIVER BASIN | 46 | 140% | 102% |

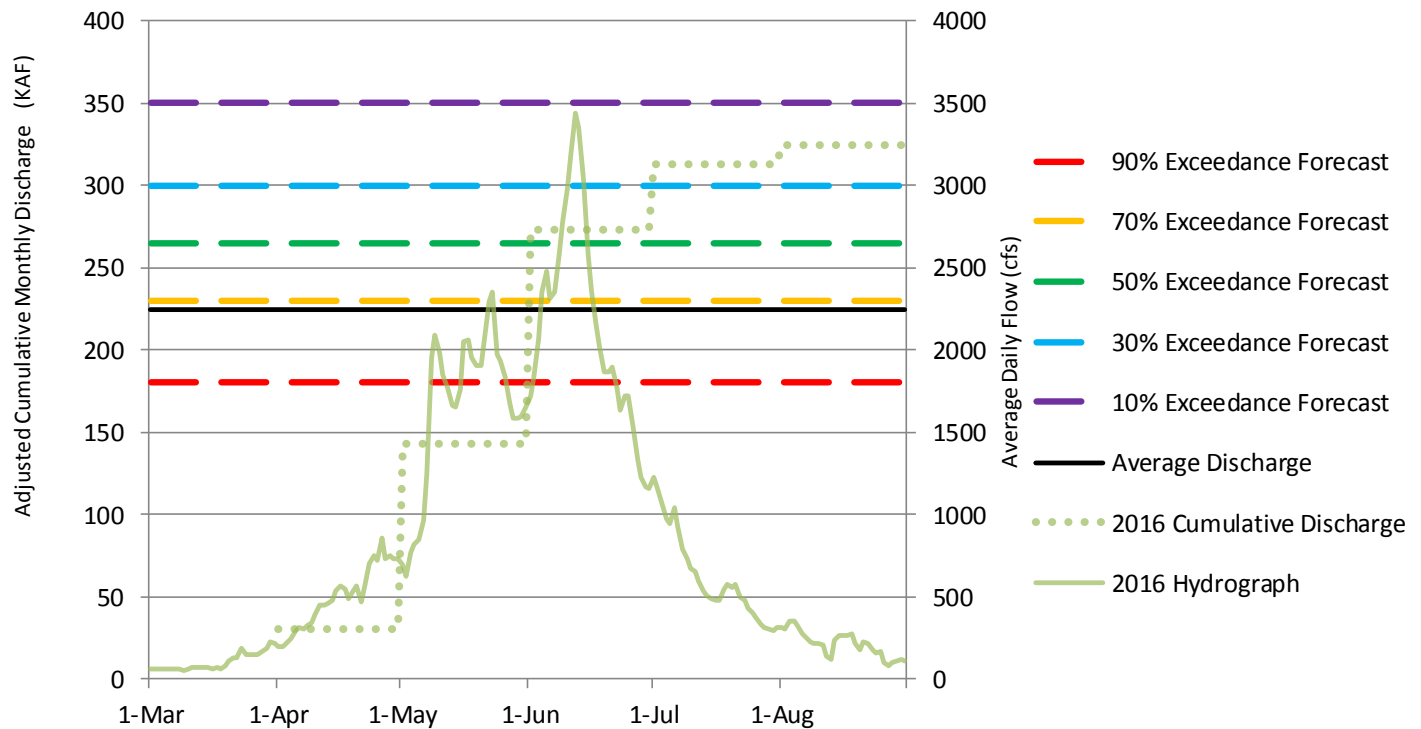
South Platte River Basin with Non-Exceedence Projections

Based on Provisional SNOTEL Data as of Mar 02, 2017



Cache La Poudre River at Canyon Mouth

Daily and Cumulative Discharge Compared to Current Streamflow Forecasts (Apr - Jul)



Please refer to the sections at the end of this report for further explanation concerning these graphs.

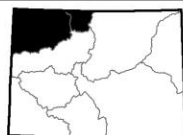
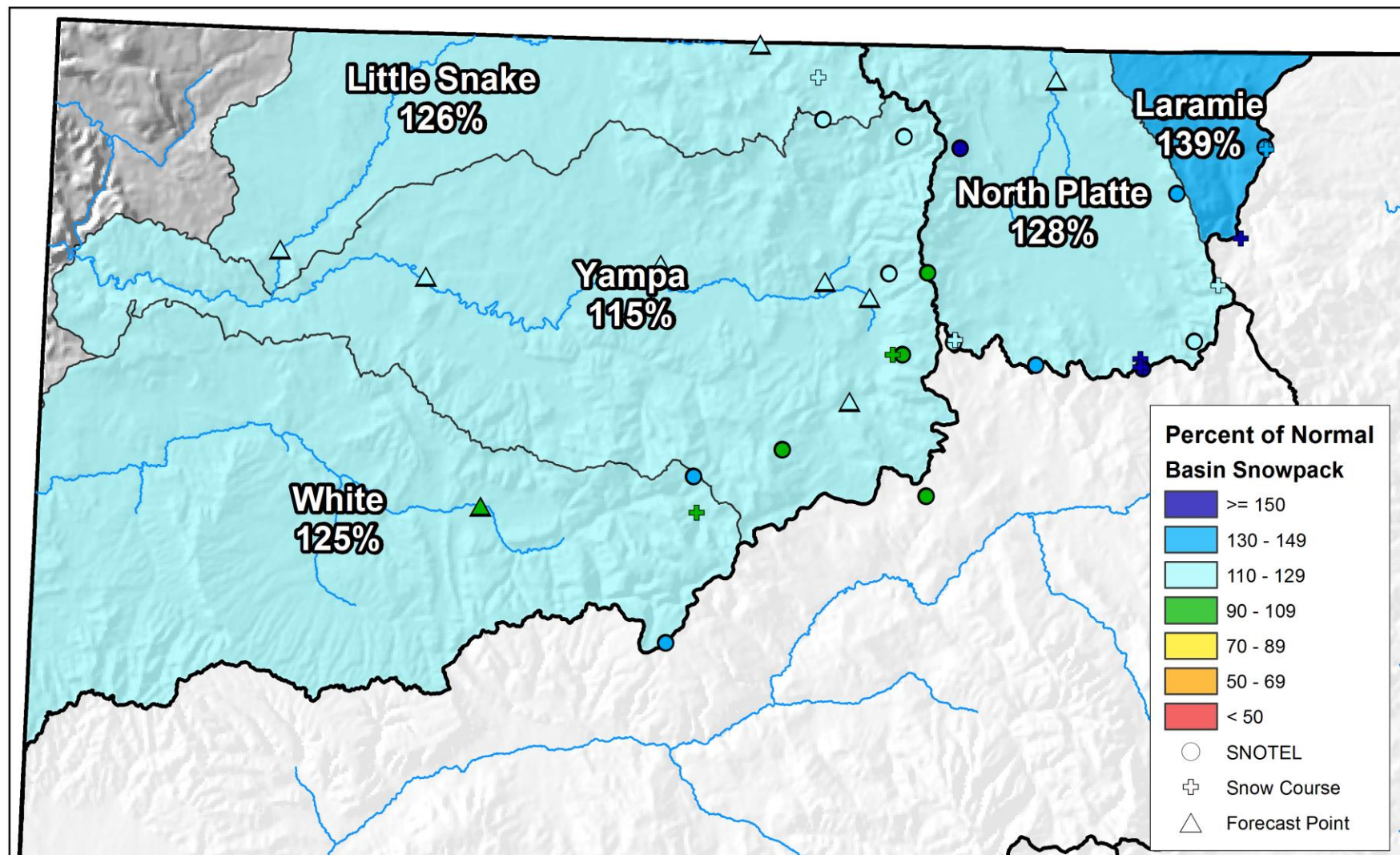
YAMPA, WHITE, NORTH PLATTE AND LARAMIE RIVER BASINS

March 1, 2017

Snowpack in the Yampa, White & North Platte basins is above normal at 126% of the median. Precipitation for February was 104% of average and water year-to-date precipitation is 120% of average. Reservoir storage at the end of February was 127% of average compared to 122% last year. Streamflow forecasts range from 134% of average for the Laramie River at Woods to 102% for the White River near Meeker.



Yampa, White, and North Platte River Basins Snowpack and Streamflow Forecasts March 1, 2017



0 10 20 40 60 80 Miles



United States Department of Agriculture

Natural Resources Conservation Service

Yampa-White-North Platte River Basins

Streamflow Forecasts - March 1, 2017

 Forecast Exceedance Probabilities for Risk Assessment
 Chance that actual volume will exceed forecast

| YAMPA-WHITE-NORTH PLATTE RIVER BASINS | Forecast Period | 90% (KAF) | 70% (KAF) | 50% (KAF) | % Avg | 30% (KAF) | 10% (KAF) | 30yr Avg (KAF) |
|--|-----------------|-----------|-----------|-----------|-------|-----------|-----------|----------------|
| North Platte R nr Northgate | APR-JUL | 158 | 235 | 285 | 127% | 335 | 410 | 225 |
| | APR-SEP | 169 | 255 | 310 | 124% | 365 | 450 | 250 |
| Laramie R nr Woods ² | APR-JUL | 97 | 131 | 154 | 134% | 177 | 210 | 115 |
| | APR-SEP | 106 | 143 | 168 | 133% | 194 | 230 | 126 |
| Yampa R ab Stagecoach Reservoir ² | APR-JUL | 12.7 | 21 | 27 | 117% | 33 | 41 | 23 |
| Yampa R at Steamboat Springs ² | APR-JUL | 205 | 255 | 285 | 110% | 315 | 365 | 260 |
| Elk R nr Milner | APR-JUL | 265 | 330 | 380 | 119% | 430 | 510 | 320 |
| Elkhead Ck ab Long Gulch | APR-JUL | 48 | 68 | 84 | 115% | 100 | 128 | 73 |
| Yampa R nr Maybell ² | APR-JUL | 695 | 905 | 1060 | 113% | 1230 | 1500 | 935 |
| Little Snake R nr Slater ² | APR-JUL | 133 | 162 | 183 | 117% | 205 | 240 | 156 |
| Little Snake R nr Dixon ² | APR-JUL | 245 | 335 | 400 | 116% | 475 | 590 | 345 |
| Little Snake R nr Lily ² | APR-JUL | 245 | 345 | 420 | 122% | 505 | 640 | 345 |
| White R nr Meeker | APR-JUL | 196 | 245 | 285 | 102% | 320 | 385 | 280 |

1) 90% and 10% exceedance probabilities are actually 95% and 5%

2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

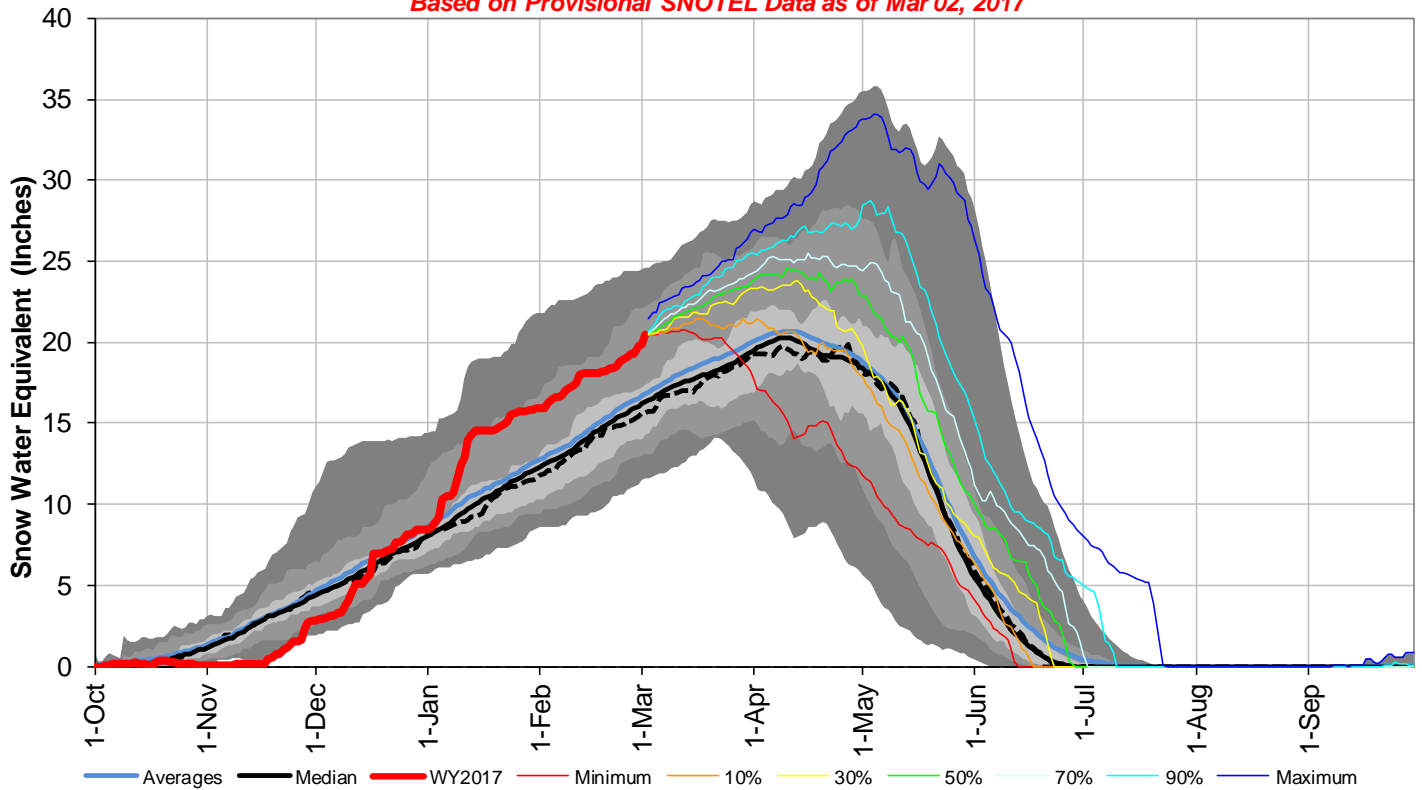
3) Median value used in place of average

| Reservoir Storage End of February, 2017 | Current (KAF) | Last Year (KAF) | Average (KAF) | Capacity (KAF) |
|--|---------------|-----------------|---------------|----------------|
| Stagecoach Reservoir nr Oak Creek | 34.4 | 33.3 | 26.9 | 36.5 |
| Yamcolo Reservoir | 7.6 | 7.0 | 6.2 | 8.7 |
| Basin-wide Total | 42.0 | 40.3 | 33.1 | 45.2 |
| # of reservoirs | 2 | 2 | 2 | 2 |

| Watershed Snowpack Analysis March 1, 2017 | # of Sites | % Median | Last Year % Median |
|--|------------|----------|--------------------|
| LARAMIE RIVER BASIN | 4 | 139% | 104% |
| NORTH PLATTE RIVER BASIN | 12 | 128% | 90% |
| LARAMIE & NORTH PLATTE RIVER BASINS | 16 | 130% | 92% |
| ELK RIVER BASIN | 2 | 128% | 79% |
| YAMPA RIVER BASIN | 11 | 115% | 95% |
| WHITE RIVER BASIN | 4 | 125% | 99% |
| YAMPA & WHITE RIVER BASINS | 14 | 116% | 94% |
| LITTLE SNAKE RIVER BASIN | 9 | 126% | 90% |
| YAMPA-WHITE-NORTH PLATTE RIVER BASINS | 35 | 126% | 94% |

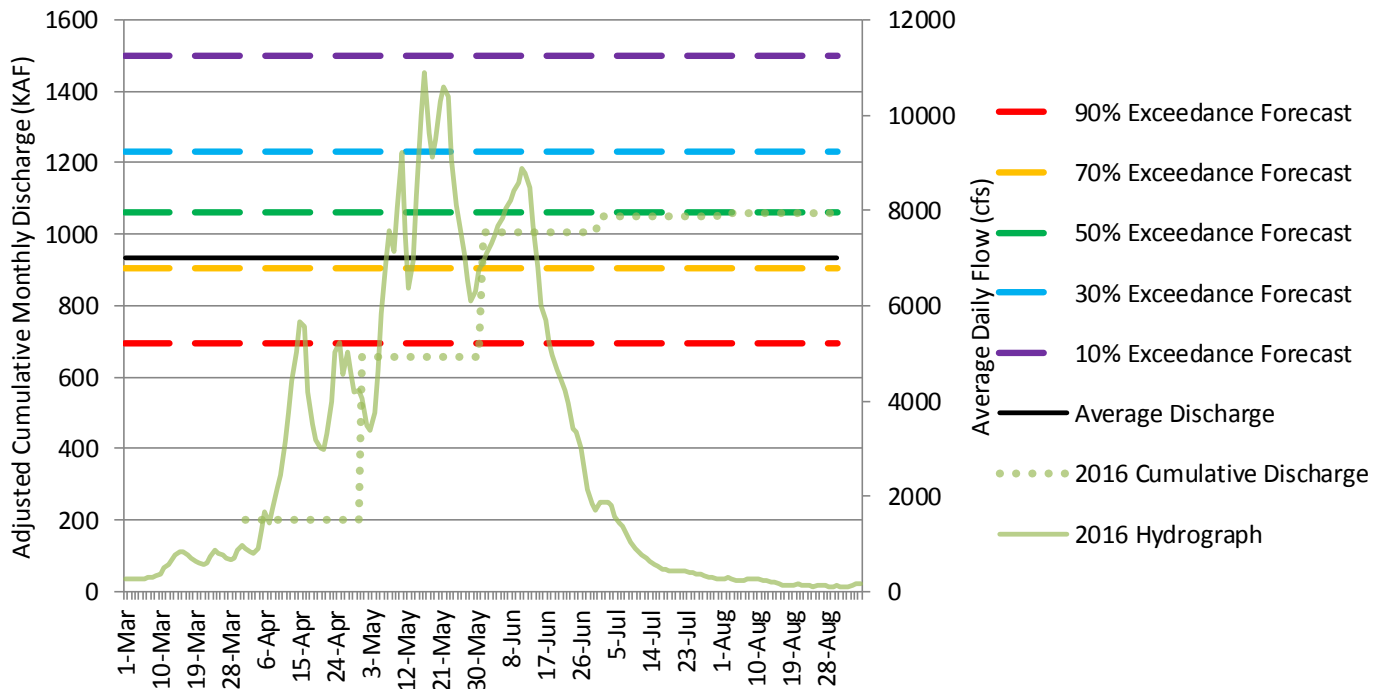
Yampa, White & North Platte River Basins with Non-Exceedence Projections

Based on Provisional SNOTEL Data as of Mar 02, 2017



Yampa River near Maybell

Daily and Cumulative Discharge Compared to Current Streamflow Forecasts (Apr - Jul)

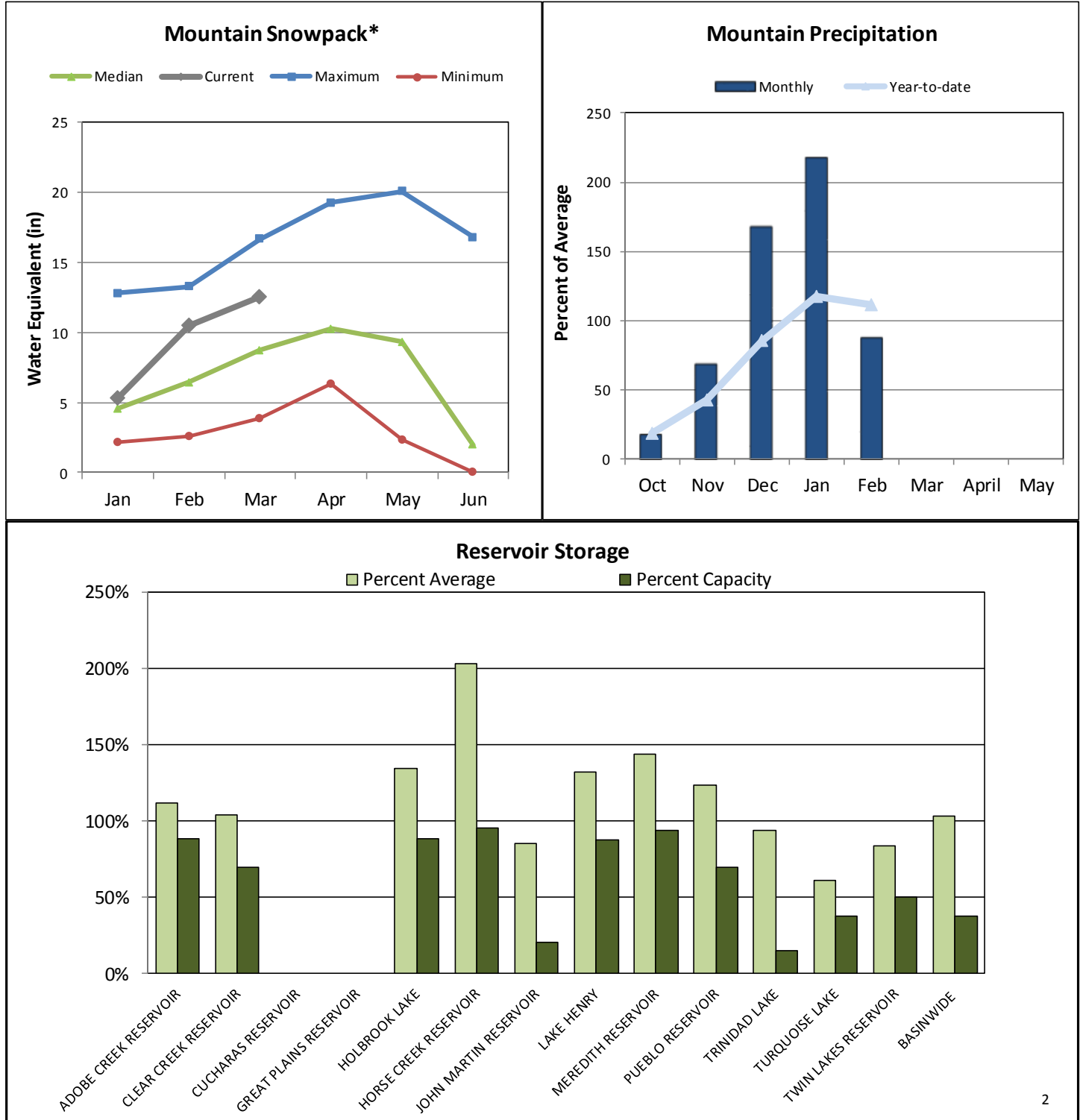


Please refer to the sections at the end of this report for further explanation concerning these graphs.

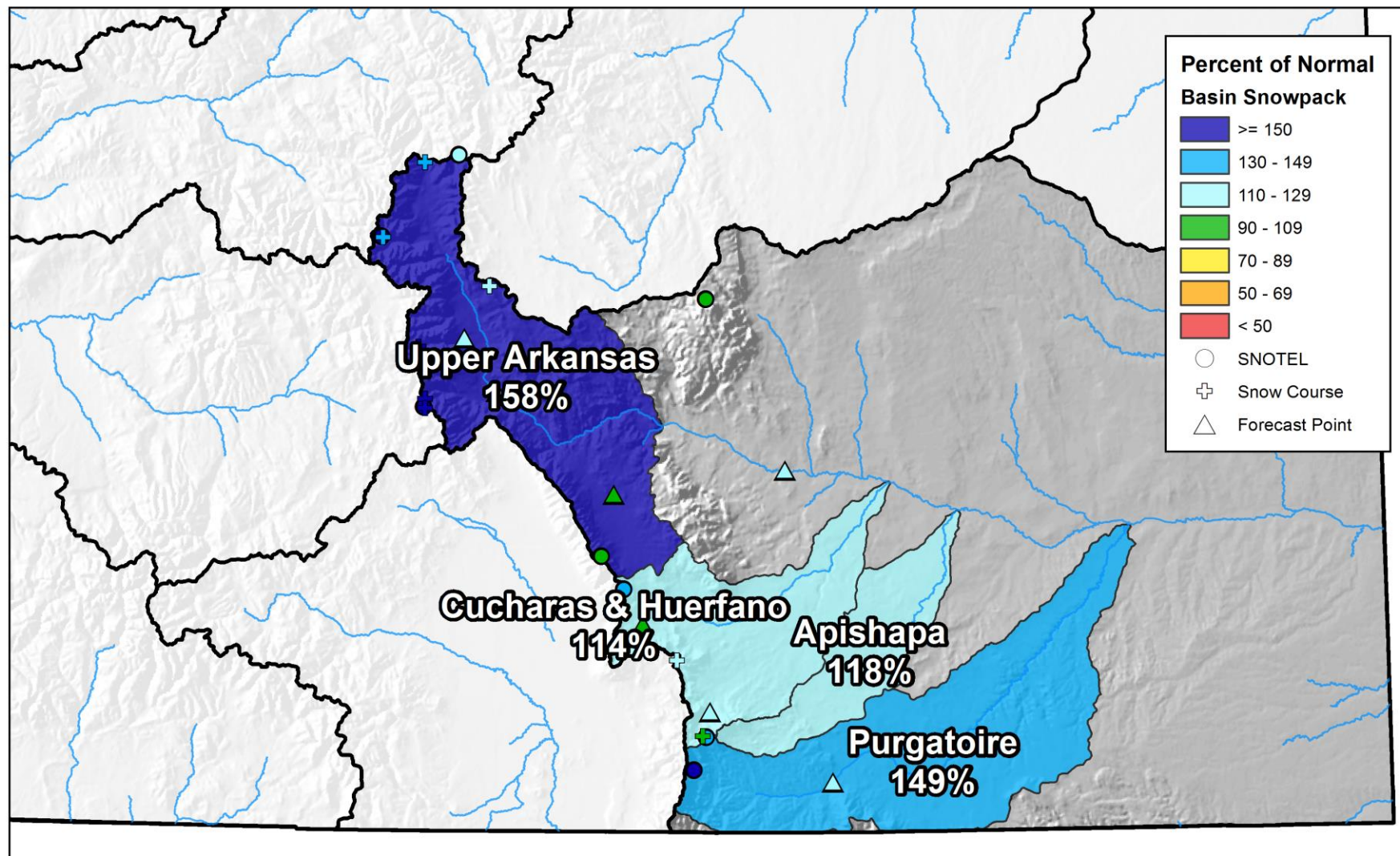
ARKANSAS RIVER BASIN

March 1, 2017

Snowpack in the Arkansas River basin is above normal at 143% of the median. Precipitation for February was 88% of average which brings water year-to-date precipitation to 111% of average. Reservoir storage at the end of February was 103% of average compared to 124% last year. Current streamflow forecasts range from 125% of average for the Arkansas River at Salida to 98% of average for Grape Creek near Westcliffe.



Arkansas River Basin Snowpack and Streamflow Forecasts March 1, 2017



0 10 20 40 60 80 Miles



United States Department of Agriculture

Natural Resources Conservation Service

Arkansas River Basin Streamflow Forecasts - March 1, 2017

 Forecast Exceedance Probabilities for Risk Assessment
 Chance that actual volume will exceed forecast

| ARKANSAS RIVER BASIN | Forecast Period | 90% (KAF) | 70% (KAF) | 50% (KAF) | % Avg | 30% (KAF) | 10% (KAF) | 30yr Avg (KAF) |
|--------------------------------------|-----------------|-----------|-----------|-----------|-------|-----------|-----------|----------------|
| Chalk Ck nr Nathrop | APR-JUL | 14.8 | 21 | 25 | 119% | 30 | 38 | 21 |
| | APR-SEP | 18 | 25 | 30 | 115% | 36 | 45 | 26 |
| Arkansas R at Salida ² | APR-JUL | 225 | 270 | 300 | 125% | 335 | 385 | 240 |
| | APR-SEP | 275 | 330 | 370 | 125% | 415 | 480 | 295 |
| Grape Ck nr Westcliffe | APR-JUL | 3.7 | 9.8 | 15.6 | 98% | 23 | 36 | 15.9 |
| | APR-SEP | 6.4 | 13.3 | 19.5 | 99% | 27 | 40 | 19.6 |
| Pueblo Reservoir Inflow ² | APR-JUL | 280 | 370 | 440 | 122% | 515 | 635 | 360 |
| | APR-SEP | 360 | 470 | 550 | 121% | 640 | 780 | 455 |
| Huerfano R nr Redwing | APR-JUL | 6.6 | 9.7 | 12.1 | 102% | 14.8 | 19.2 | 11.9 |
| | APR-SEP | 8.9 | 12.6 | 15.5 | 102% | 18.7 | 24 | 15.2 |
| Cucharas R nr La Veta | APR-JUL | 6.5 | 10.5 | 13.8 | 113% | 17.5 | 24 | 12.2 |
| | APR-SEP | 8.2 | 12.5 | 16 | 113% | 19.9 | 26 | 14.1 |
| Trinidad Lake Inflow ² | MAR-JUL | 18.1 | 32 | 43 | 116% | 56 | 78 | 37 |
| | APR-SEP | 24 | 40 | 54 | 115% | 70 | 97 | 47 |

1) 90% and 10% exceedance probabilities are actually 95% and 5%

2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

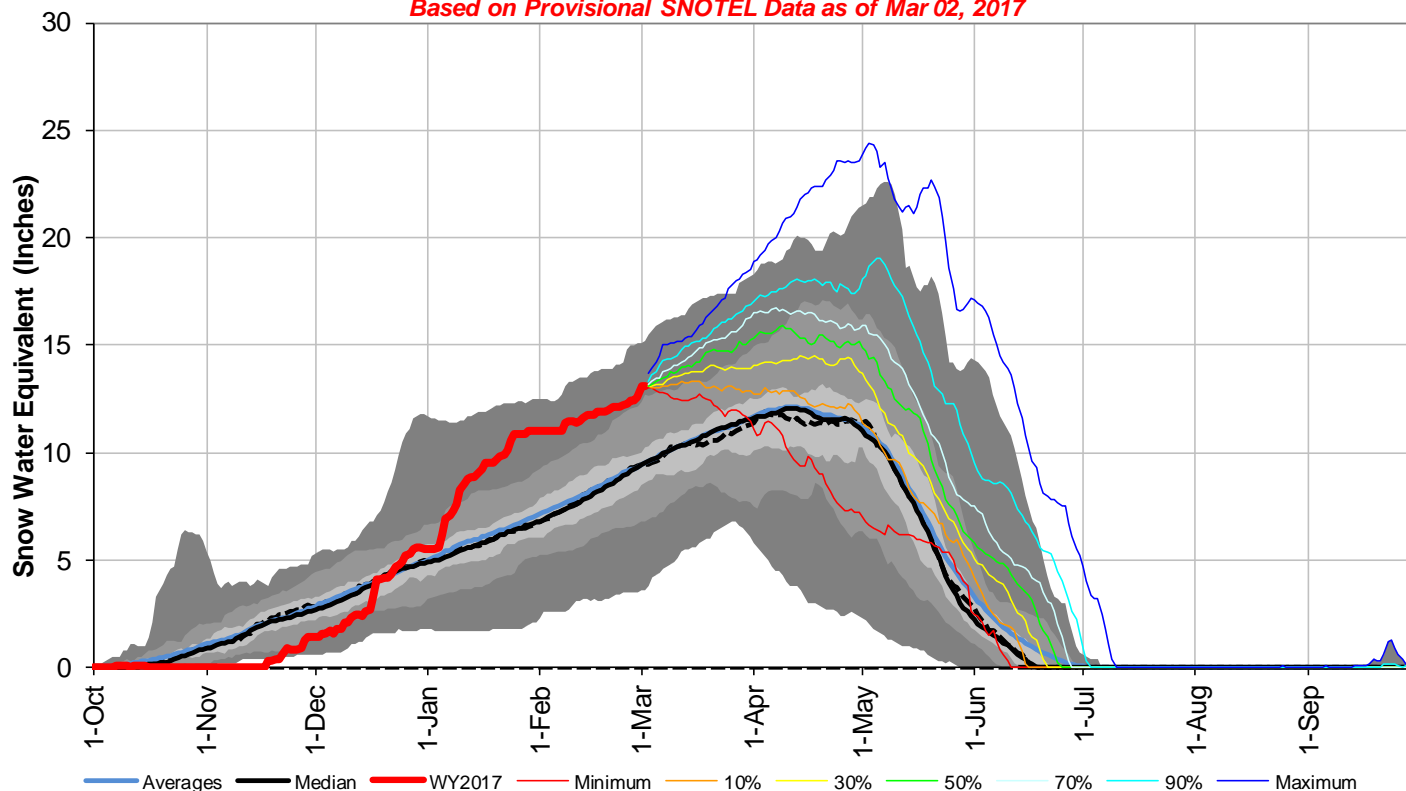
3) Median value used in place of average

| Reservoir Storage End of February, 2017 | Current (KAF) | Last Year (KAF) | Average (KAF) | Capacity (KAF) |
|--|---------------|-----------------|---------------|----------------|
| Adobe Creek Reservoir | 54.6 | 73.6 | 48.9 | 62.0 |
| Clear Creek Reservoir | 7.9 | 8.2 | 7.6 | 11.4 |
| Cucharas Reservoir | | | 5.9 | 40.0 |
| Great Plains Reservoir | | 0.0 | 33.7 | 150.0 |
| Holbrook Lake | 6.2 | 2.2 | 4.6 | 7.0 |
| Horse Creek Reservoir | 25.8 | 26.5 | 12.7 | 27.0 |
| John Martin Reservoir | 126.8 | 238.9 | 148.2 | 616.0 |
| Lake Henry | 8.2 | 7.3 | 6.2 | 9.4 |
| Meredith Reservoir | 39.5 | 40.9 | 27.4 | 42.0 |
| Pueblo Reservoir | 247.9 | 268.6 | 200.6 | 354.0 |
| Trinidad Lake | 25.1 | 27.8 | 26.8 | 167.0 |
| Turquoise Lake | 48.2 | 60.6 | 78.5 | 127.0 |
| Twin Lakes Reservoir | 43.2 | 48.5 | 51.8 | 86.0 |
| Basin-wide Total | 633.4 | 803.1 | 613.3 | 1508.8 |
| # of reservoirs | 11 | 11 | 11 | 11 |

| Watershed Snowpack Analysis March 1, 2017 | # of Sites | % Median | Last Year % Median |
|--|------------|----------|--------------------|
| UPPER ARKANSAS BASIN | 9 | 158% | 112% |
| CUCHARAS & HUERFANO BASINS | 5 | 114% | 87% |
| PURGATOIRE RIVER BASIN | 2 | 149% | 71% |
| ARKANSAS RIVER BASIN | 16 | 143% | 102% |

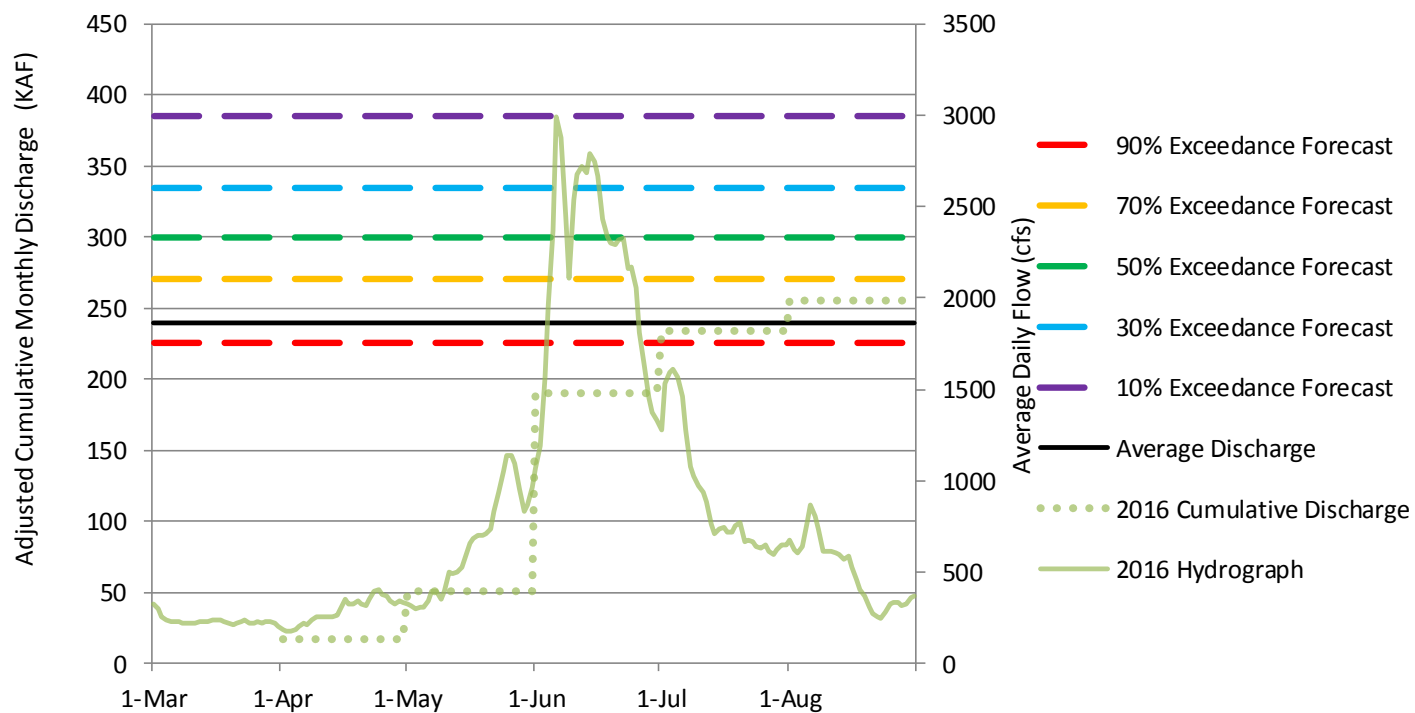
Arkansas River Basin with Non-Exceedence Projections

Based on Provisional SNOTEL Data as of Mar 02, 2017



Arkansas River at Salida, CO

Daily and Cumulative Discharge Compared to Current Streamflow Forecasts (Apr - Jul)

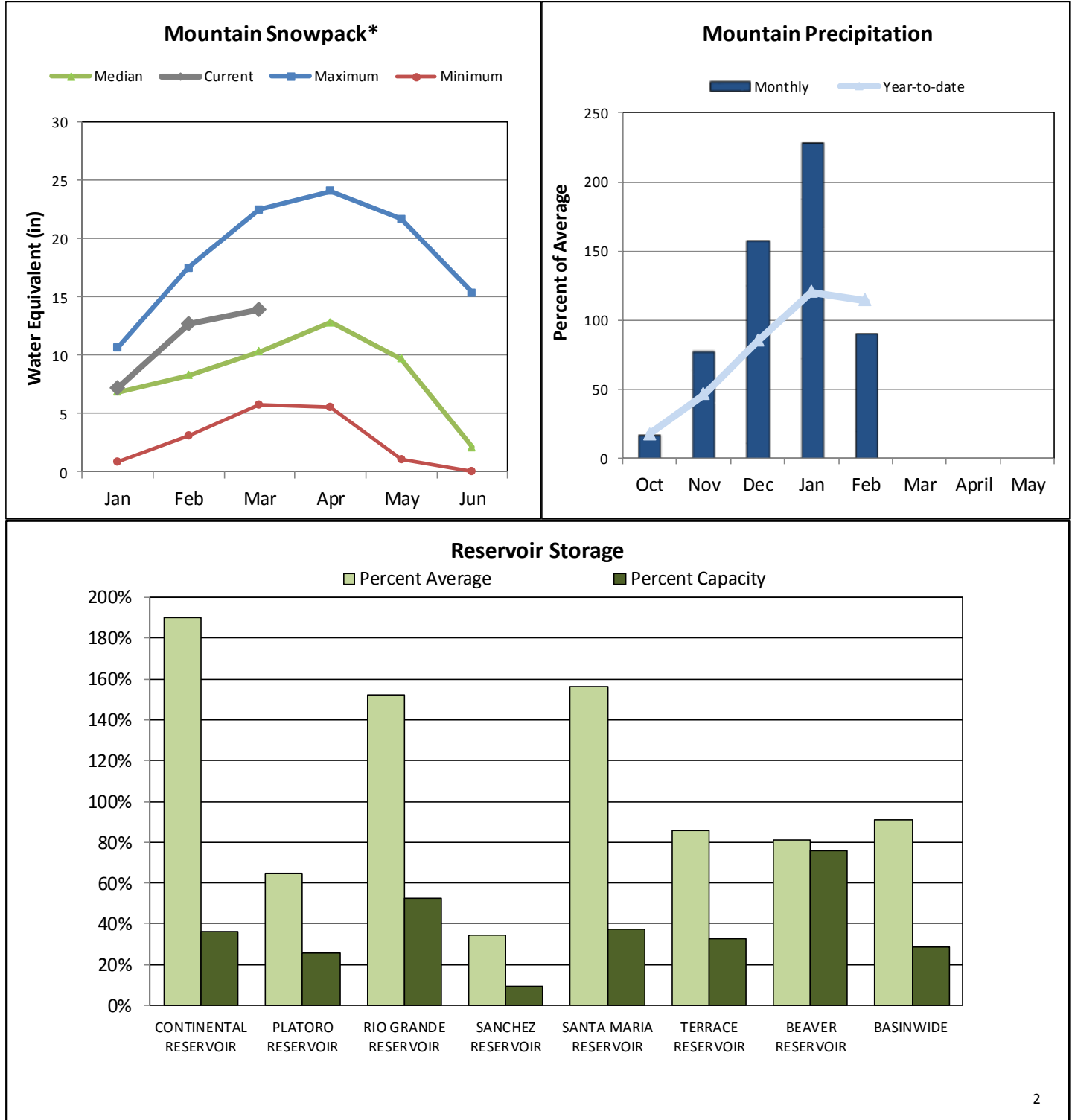


Please refer to the sections at the end of this report for further explanation concerning these graphs.

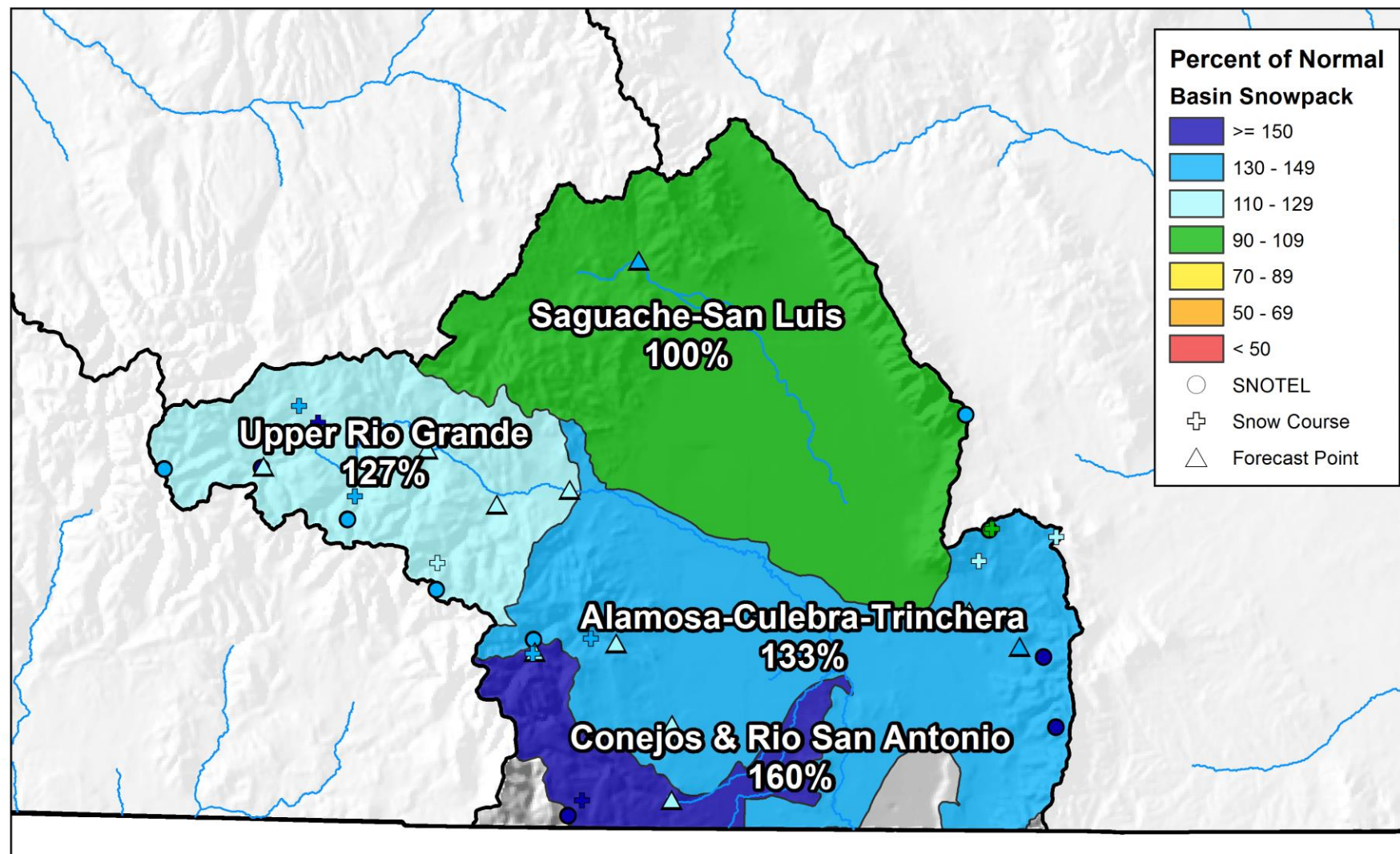
UPPER RIO GRANDE RIVER BASIN

March 1, 2017

Snowpack in the Upper Rio Grande River basin is above normal at 136% of median. Precipitation for February was 90% of average which brings water year-to-date precipitation to 114% of average. Reservoir storage at the end of February was 91% of average compared to 93% last year. Streamflow forecasts range from 160% of average for the San Antonio River at Ortiz to 110% of average for the Alamosa Creek above Terrace Reservoir.



Upper Rio Grande River Basin Snowpack and Streamflow Forecasts March 1, 2017



0 10 20 40 60 80 Miles



United States Department of Agriculture

Natural Resources Conservation Service

Upper Rio Grande Basin Streamflow Forecasts - March 1, 2017

 Forecast Exceedance Probabilities for Risk Assessment
 Chance that actual volume will exceed forecast

| UPPER RIO GRANDE BASIN | Forecast Period | 90% (KAF) | 70% (KAF) | 50% (KAF) | % Avg | 30% (KAF) | 10% (KAF) | 30yr Avg (KAF) |
|---|-----------------|-----------|-----------|-----------|-------|-----------|-----------|----------------|
| Rio Grande at Thirty Mile Bridge ² | APR-JUL | 91 | 112 | 128 | 113% | 145 | 171 | 113 |
| | APR-SEP | 101 | 126 | 145 | 112% | 165 | 197 | 129 |
| Rio Grande at Wagon Wheel Gap ² | APR-SEP | 265 | 335 | 390 | 115% | 450 | 540 | 340 |
| SF Rio Grande at South Fork ² | APR-SEP | 106 | 131 | 150 | 118% | 170 | 200 | 127 |
| Rio Grande nr Del Norte ² | APR-SEP | 410 | 525 | 610 | 118% | 700 | 850 | 515 |
| Saguache Ck nr Saguache | APR-SEP | 26 | 35 | 43 | 134% | 51 | 65 | 32 |
| Alamosa Ck ab Terrace Reservoir | APR-SEP | 52 | 65 | 75 | 110% | 86 | 103 | 68 |
| La Jara Ck nr Capulin | MAR-JUL | 6.5 | 8.9 | 10.8 | 121% | 12.9 | 16.2 | 8.9 |
| Trinchera Ck ab Turners Ranch | APR-SEP | 12.8 | 15 | 16.7 | 133% | 18.4 | 21 | 12.6 |
| Sangre de Cristo Ck ² | APR-SEP | 11.8 | 17 | 21 | 129% | 25 | 33 | 16.3 |
| Ute Ck nr Fort Garland | APR-SEP | 10.1 | 13.4 | 16 | 125% | 18.8 | 23 | 12.8 |
| Platoro Reservoir Inflow | APR-JUL | 48 | 58 | 65 | 116% | 72 | 84 | 56 |
| | APR-SEP | 52 | 64 | 72 | 116% | 81 | 95 | 62 |
| Conejos R nr Mogote ² | APR-SEP | 180 | 220 | 250 | 129% | 280 | 330 | 194 |
| San Antonio R at Ortiz | APR-SEP | 16.2 | 21 | 25 | 160% | 29 | 36 | 15.6 |
| Los Pinos R nr Ortiz | APR-SEP | 79 | 97 | 110 | 151% | 124 | 146 | 73 |
| Culebra Ck at San Luis | APR-SEP | 17.8 | 25 | 30 | 130% | 35 | 45 | 23 |
| Costilla Reservoir Inflow | MAR-JUL | 8.9 | 11.7 | 13.9 | 125% | 16.2 | 19.9 | 11.1 |
| Costilla Ck nr Costilla ² | MAR-JUL | 19.3 | 27 | 33 | 127% | 40 | 51 | 26 |

1) 90% and 10% exceedance probabilities are actually 95% and 5%

2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

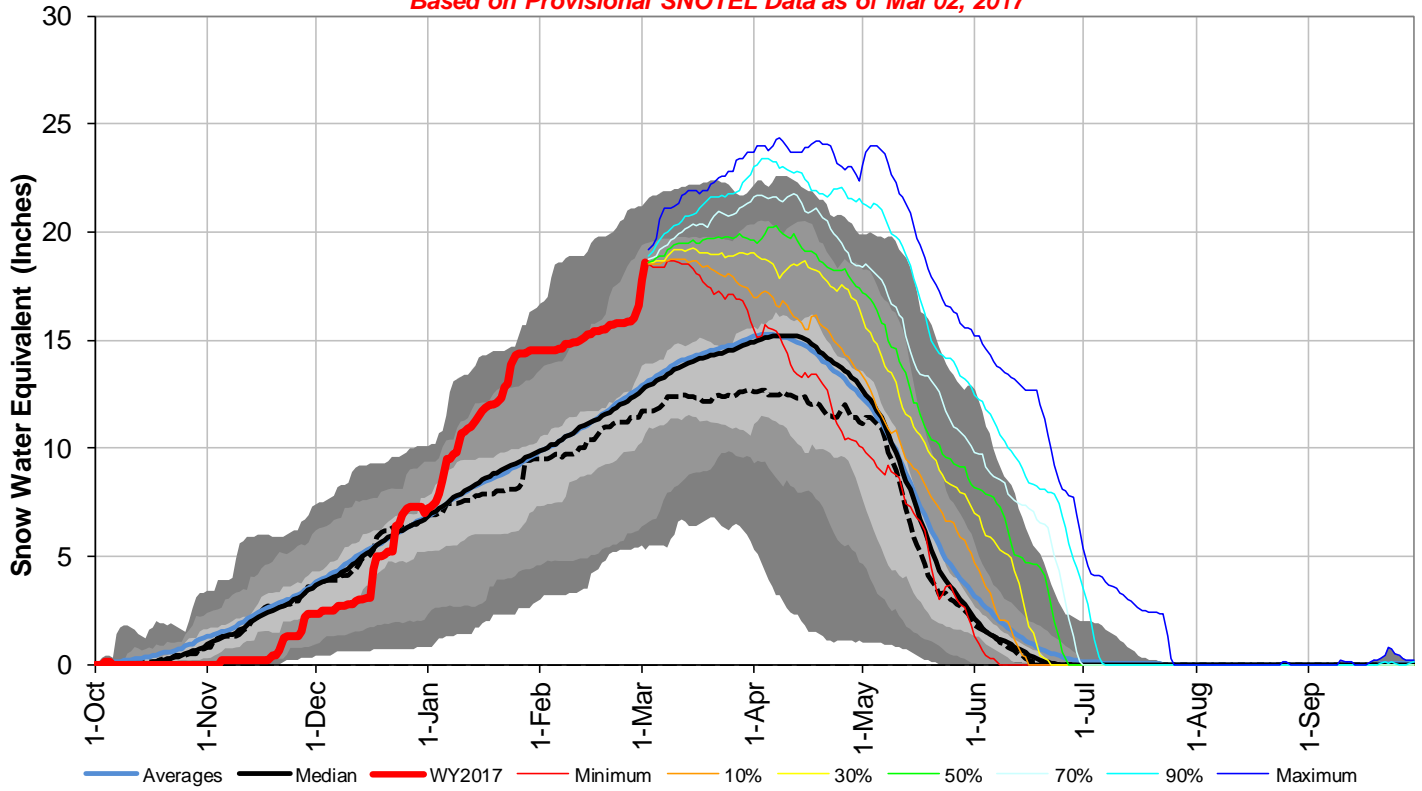
3) Median value used in place of average

| Reservoir Storage End of February, 2017 | Current (KAF) | Last Year (KAF) | Average (KAF) | Capacity (KAF) |
|--|---------------|-----------------|---------------|----------------|
| Beaver Reservoir | 3.4 | 2.5 | 4.2 | 4.5 |
| Continental Reservoir | 9.7 | 4.4 | 5.1 | 27.0 |
| Platoro Reservoir | 15.5 | 13.1 | 23.9 | 60.0 |
| Rio Grande Reservoir | 26.8 | 33.1 | 17.6 | 51.0 |
| Sanchez Reservoir | 9.5 | 11.3 | 27.6 | 103.0 |
| Santa Maria Reservoir | 16.7 | 19.6 | 10.7 | 45.0 |
| Terrace Reservoir | 5.9 | 5.6 | 6.9 | 18.0 |
| Basin-wide Total | 87.5 | 89.6 | 96.0 | 308.5 |
| # of reservoirs | 7 | 7 | 7 | 7 |

| Watershed Snowpack Analysis March 1, 2017 | # of Sites | % Median | Last Year % Median |
|--|------------|----------|--------------------|
| ALAMOSA CREEK BASIN | 3 | 140% | 99% |
| CONEJOS & RIO SAN ANTONIO BASINS | 4 | 160% | 95% |
| CULEBRA & TRINCHERA BASINS | 4 | 131% | 100% |
| HEADWATERS RIO GRANDE RIVER BASIN | 11 | 127% | 98% |
| UPPER RIO GRANDE BASIN | 21 | 138% | 97% |

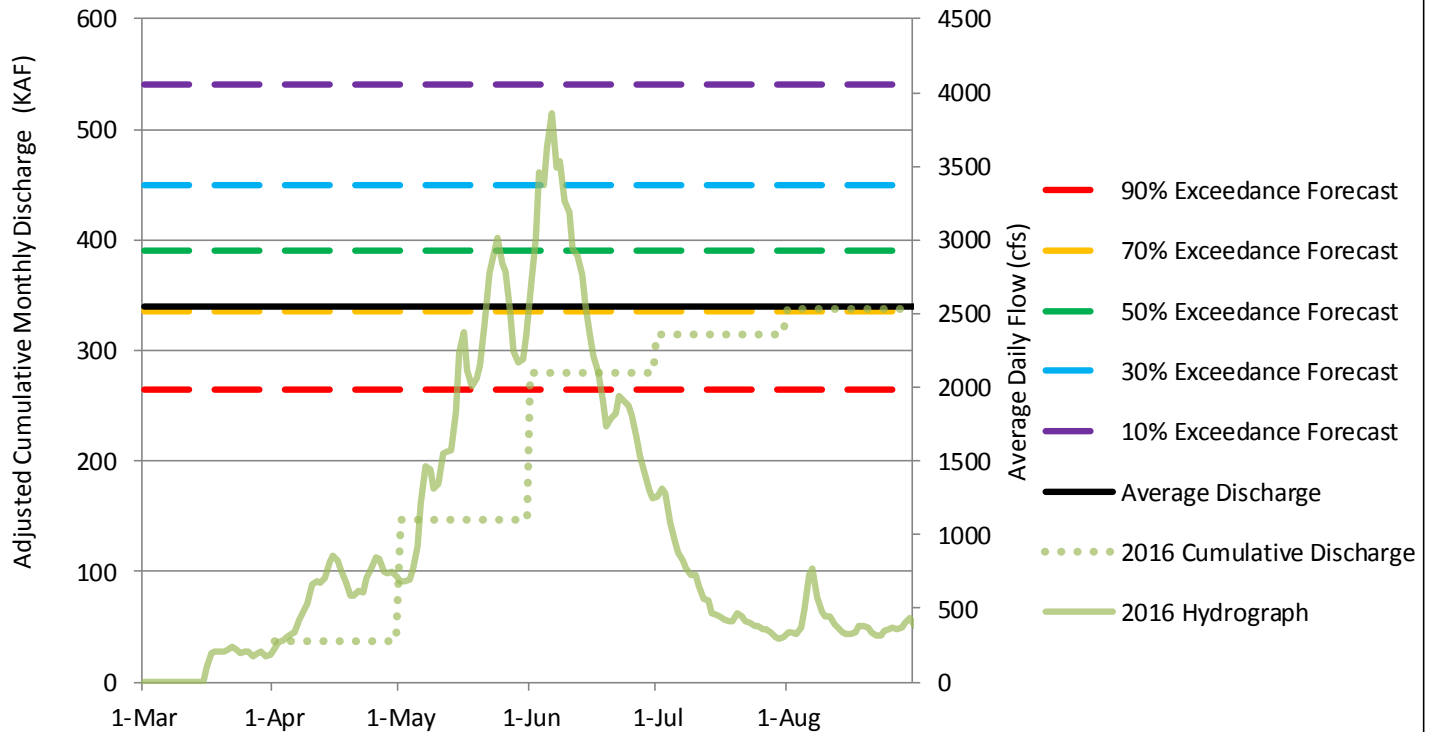
Upper Rio Grande River Basin with Non-Exceedence Projections

Based on Provisional SNOTEL Data as of Mar 02, 2017



Rio Grande at Wagon Wheel Gap

Daily and Cumulative Discharge Compared to Current Streamflow Forecasts (Apr-Sep)

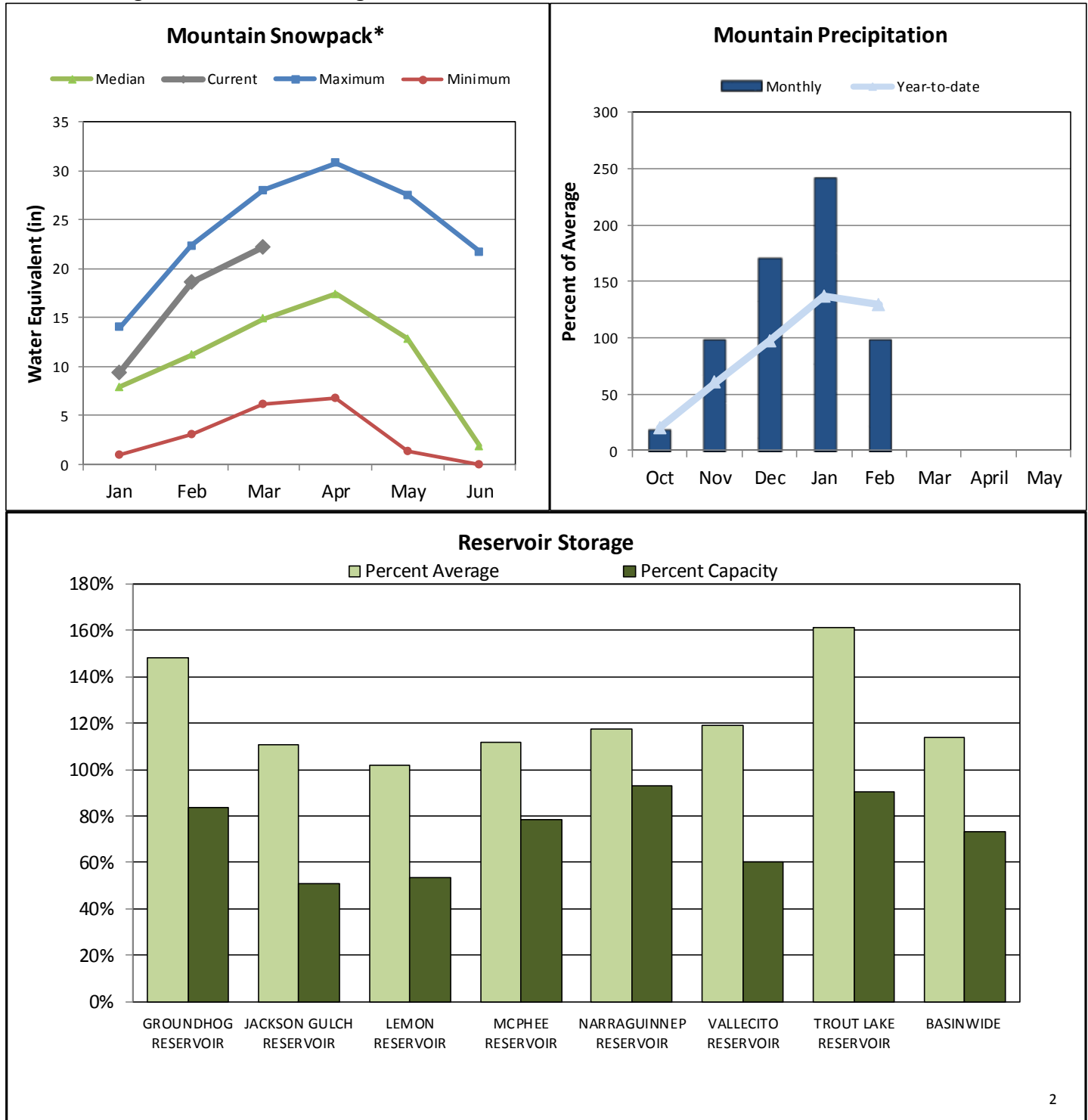


Please refer to the sections at the end of this report for further explanation concerning these graphs.

SAN MIGUEL, DOLORES, ANIMAS, AND SAN JUAN RIVER BASINS

March 1, 2017

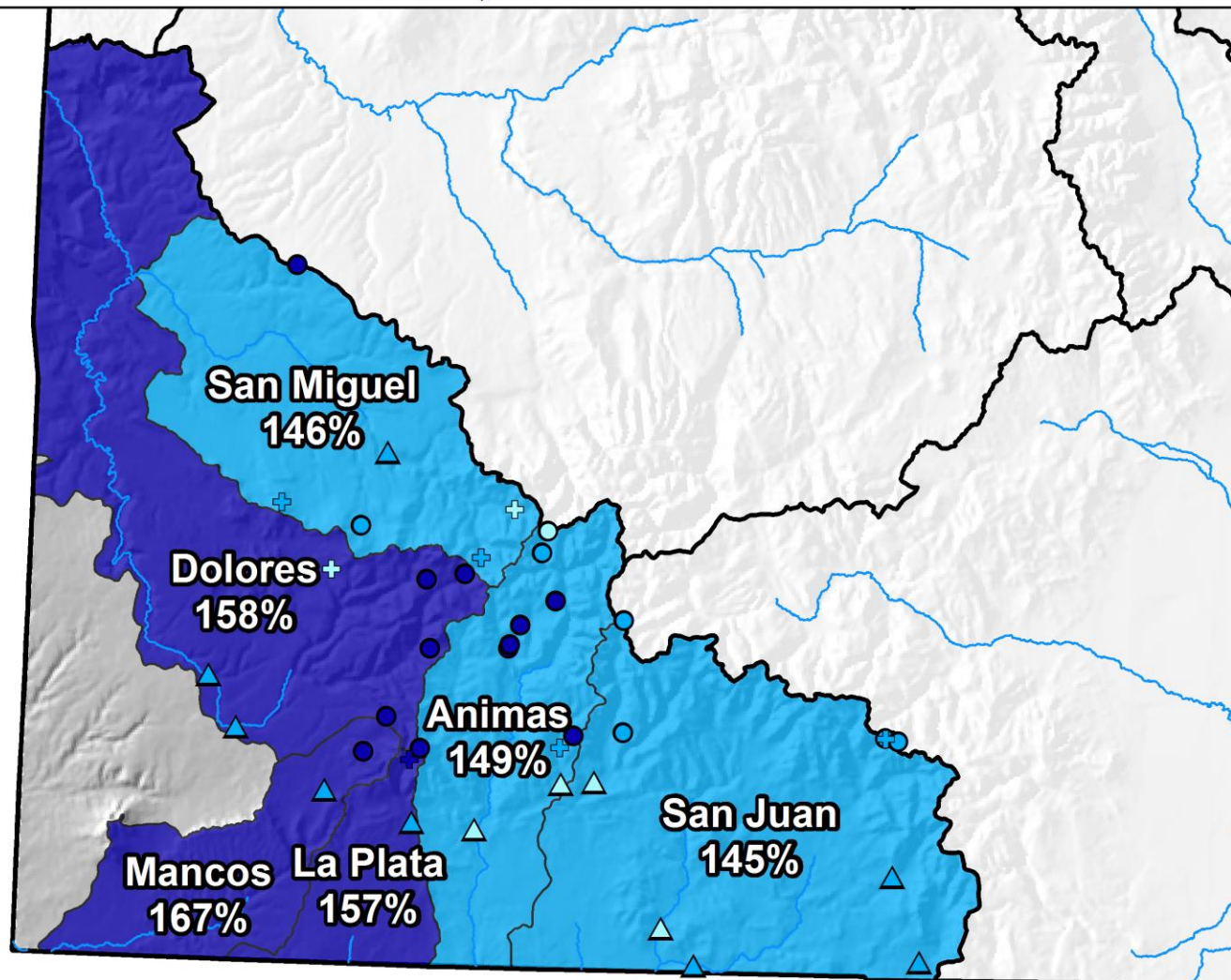
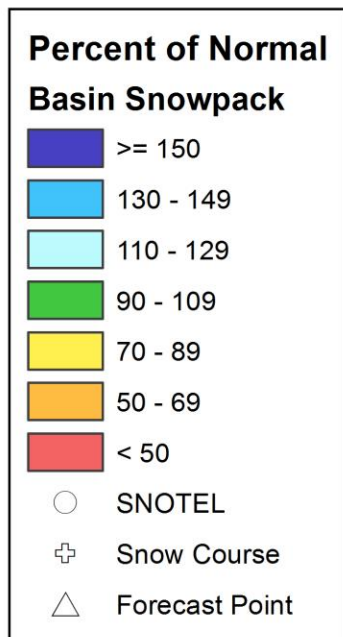
Snowpack in the combined southwest river basins is above normal at 149% of median. Precipitation for February was 99% of average which brings water year-to-date precipitation to 129% of average. Reservoir storage at the end of February was 114% of average compared to 104% last year. Current streamflow forecasts range from 142% of average for the inflow to McPhee Reservoir to 111% for the inflow to Vallecito.



San Miguel, Dolores, Animas, and San Juan River Basins

Snowpack and Streamflow Forecasts

March 1, 2017



0 10 20 40 60 80 Miles



United States Department of Agriculture

Natural Resources Conservation Service

San Miguel-Dolores-Animas-San Juan River Basins Streamflow Forecasts - March 1, 2017

 Forecast Exceedance Probabilities for Risk Assessment
 Chance that actual volume will exceed forecast

| SAN MIGUEL-DOLORES-ANIMAS-SAN JUAN RIVER BASINS | Forecast Period | 90% (KAF) | 70% (KAF) | 50% (KAF) | % Avg | 30% (KAF) | 10% (KAF) | 30yr Avg (KAF) |
|---|-----------------|-----------|-----------|-----------|-------|-----------|-----------|----------------|
| Dolores R at Dolores | APR-JUL | 250 | 300 | 340 | 139% | 380 | 445 | 245 |
| McPhee Reservoir Inflow | APR-JUL | 300 | 370 | 420 | 142% | 475 | 565 | 295 |
| San Miguel R nr Placerville | APR-JUL | 116 | 146 | 169 | 132% | 192 | 230 | 128 |
| Cone Reservoir Inlet | APR-JUL | 3.1 | 3.7 | 4.2 | 135% | 4.7 | 5.5 | 3.1 |
| Gurley Reservoir Inlet | APR-JUL | 16.5 | 19.7 | 22 | 135% | 24 | 28 | 16.3 |
| Lilylands Reservoir Inlet | APR-JUL | 2.3 | 3.1 | 3.7 | 137% | 4.3 | 5.4 | 2.7 |
| Rio Blanco at Blanco Diversion ² | APR-JUL | 50 | 64 | 74 | 137% | 85 | 102 | 54 |
| Navajo R at Oso Diversion ² | APR-JUL | 62 | 78 | 90 | 138% | 104 | 125 | 65 |
| San Juan R nr Carracas ² | APR-JUL | 355 | 450 | 525 | 138% | 605 | 730 | 380 |
| Piedra R nr Arboles | APR-JUL | 167 | 210 | 240 | 114% | 275 | 325 | 210 |
| Vallecito Reservoir Inflow | APR-JUL | 160 | 192 | 215 | 111% | 240 | 280 | 194 |
| Navajo Reservoir Inflow ² | APR-JUL | 655 | 815 | 935 | 127% | 1060 | 1270 | 735 |
| Animas R at Durango | APR-JUL | 365 | 440 | 500 | 120% | 560 | 655 | 415 |
| Lemon Reservoir Inflow | APR-JUL | 45 | 55 | 63 | 115% | 71 | 84 | 55 |
| La Plata R at Hesperus | APR-JUL | 22 | 27 | 30 | 130% | 34 | 40 | 23 |
| Mancos R nr Mancos ² | APR-JUL | 27 | 35 | 41 | 132% | 47 | 58 | 31 |

1) 90% and 10% exceedance probabilities are actually 95% and 5%

2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

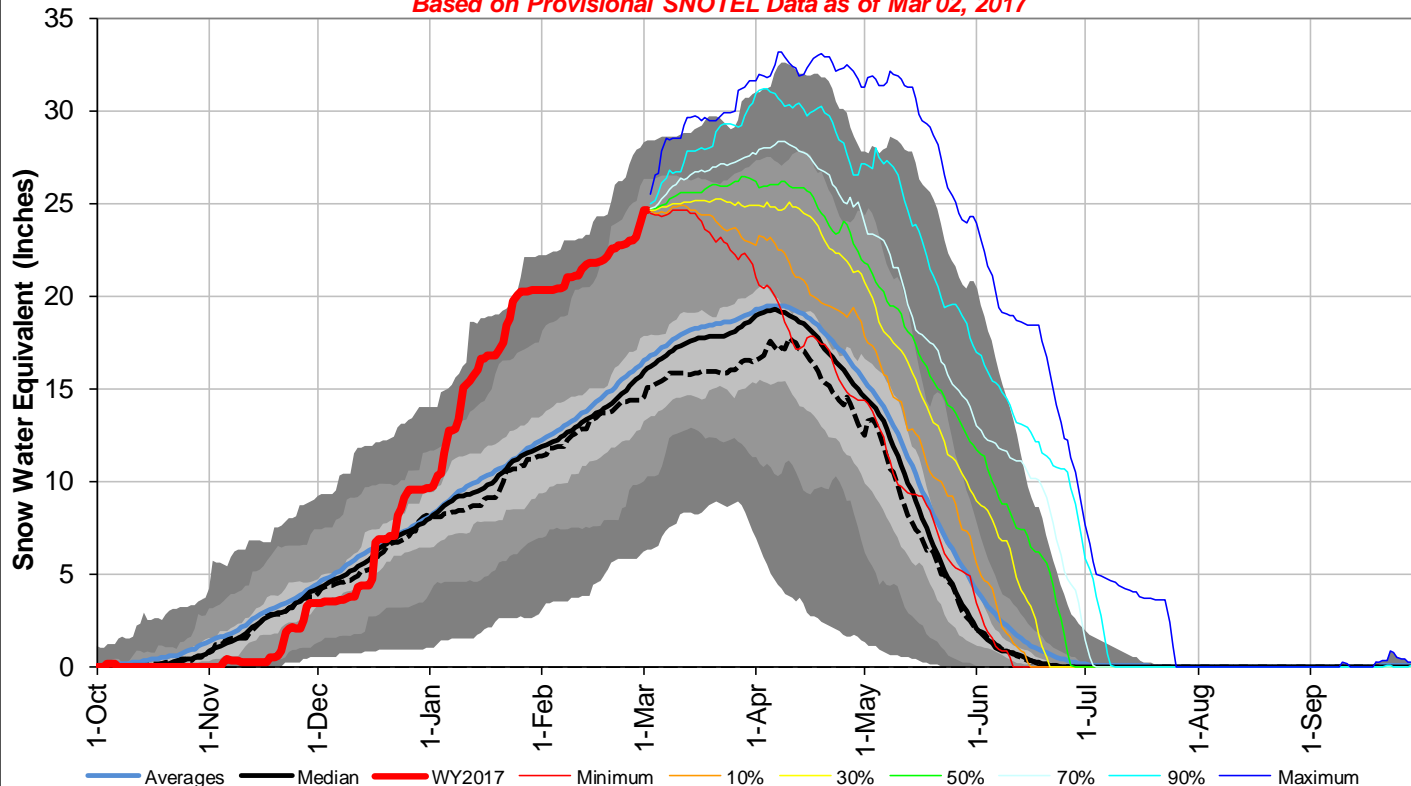
3) Median value used in place of average

| Reservoir Storage End of February, 2017 | Current (KAF) | Last Year (KAF) | Average (KAF) | Capacity (KAF) |
|--|------------------|--------------------|------------------|-------------------|
| Groundhog Reservoir | 18.4 | 19.5 | 12.4 | 22.0 |
| Jackson Gulch Reservoir | 5.1 | 5.2 | 4.6 | 10.0 |
| Lemon Reservoir | 21.4 | 21.5 | 21.0 | 40.0 |
| McPhee Reservoir | 298.8 | 249.5 | 268.0 | 381.0 |
| Narraguinnep Reservoir | 17.7 | 16.9 | 15.1 | 19.0 |
| Trout Lake Reservoir | 2.9 | 2.5 | 1.8 | 3.2 |
| Vallecito Reservoir | 75.8 | 86.4 | 63.6 | 126.0 |
| Basin-wide Total | 440.1 | 401.5 | 386.5 | 601.2 |
| # of reservoirs | 7 | 7 | 7 | 7 |

| Watershed Snowpack Analysis March 1, 2017 | # of Sites | % Median | Last Year % Median |
|---|------------|----------|-----------------------|
| ANIMAS RIVER BASIN | 11 | 149% | 91% |
| DOLORES RIVER BASIN | 7 | 158% | 106% |
| SAN MIGUEL RIVER BASIN | 5 | 149% | 110% |
| SAN JUAN RIVER BASIN | 4 | 145% | 96% |
| SAN MIGUEL-DOLORES-ANIMAS-SAN JUAN RIVER BASINS | 25 | 150% | 97% |

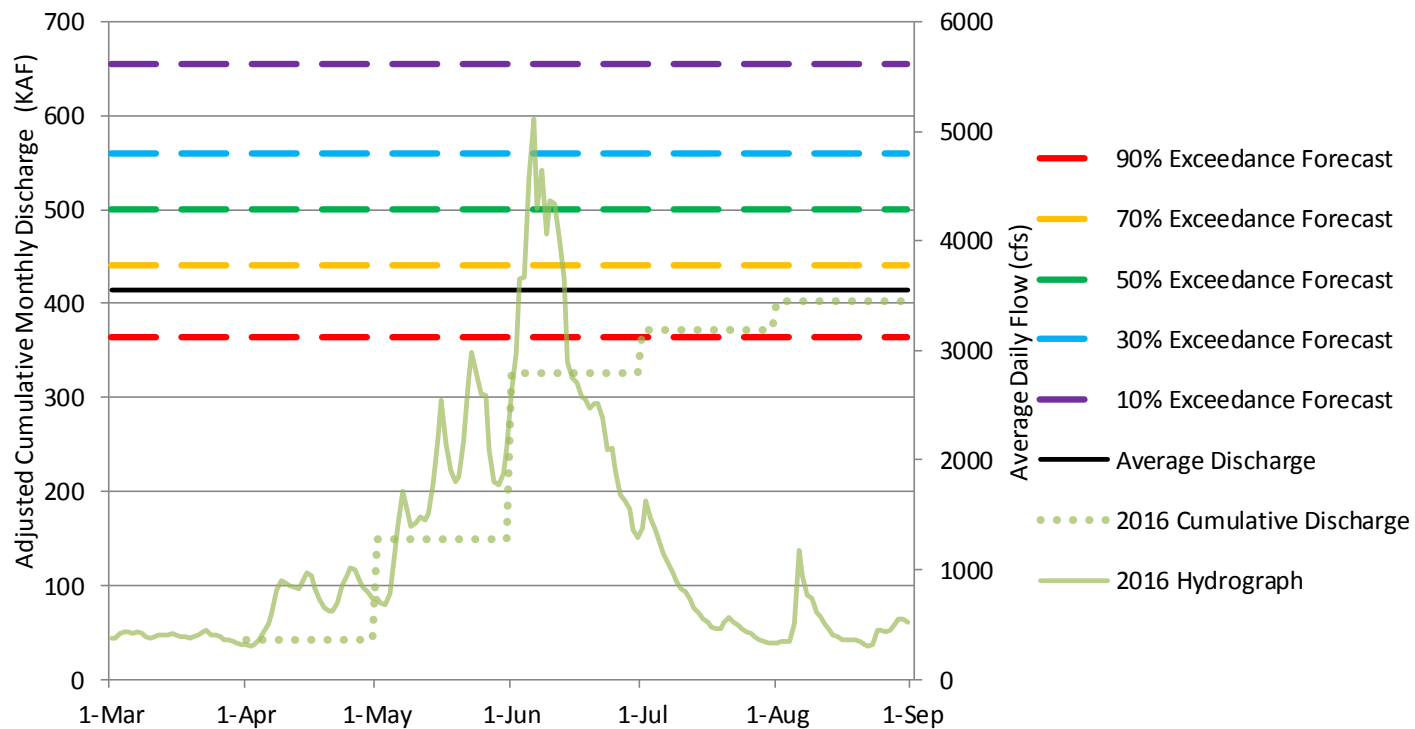
San Miguel, Dolores, Animas and San Juan River Basin with Non-Exceedence Projections

Based on Provisional SNOTEL Data as of Mar 02, 2017



Animas River at Durango, CO

Daily and Cumulative Discharge Compared to Current Streamflow Forecasts (Apr - Jul)



Please refer to the sections at the end of this report for further explanation concerning these graphs.

How to Read Non-Exceedance Projections Graphs

The graphs show snow water equivalent (SWE) projections (in inches) for the October 1 through September 30 water year. Basin “observed” SWE values are computed using SNOTEL sites which are characteristic of the snowpack of the particular basin. The SWE observations at these sites are averaged and normalized to produce these basin snowpack graphs. This new graph format uses non-exceedance projections.

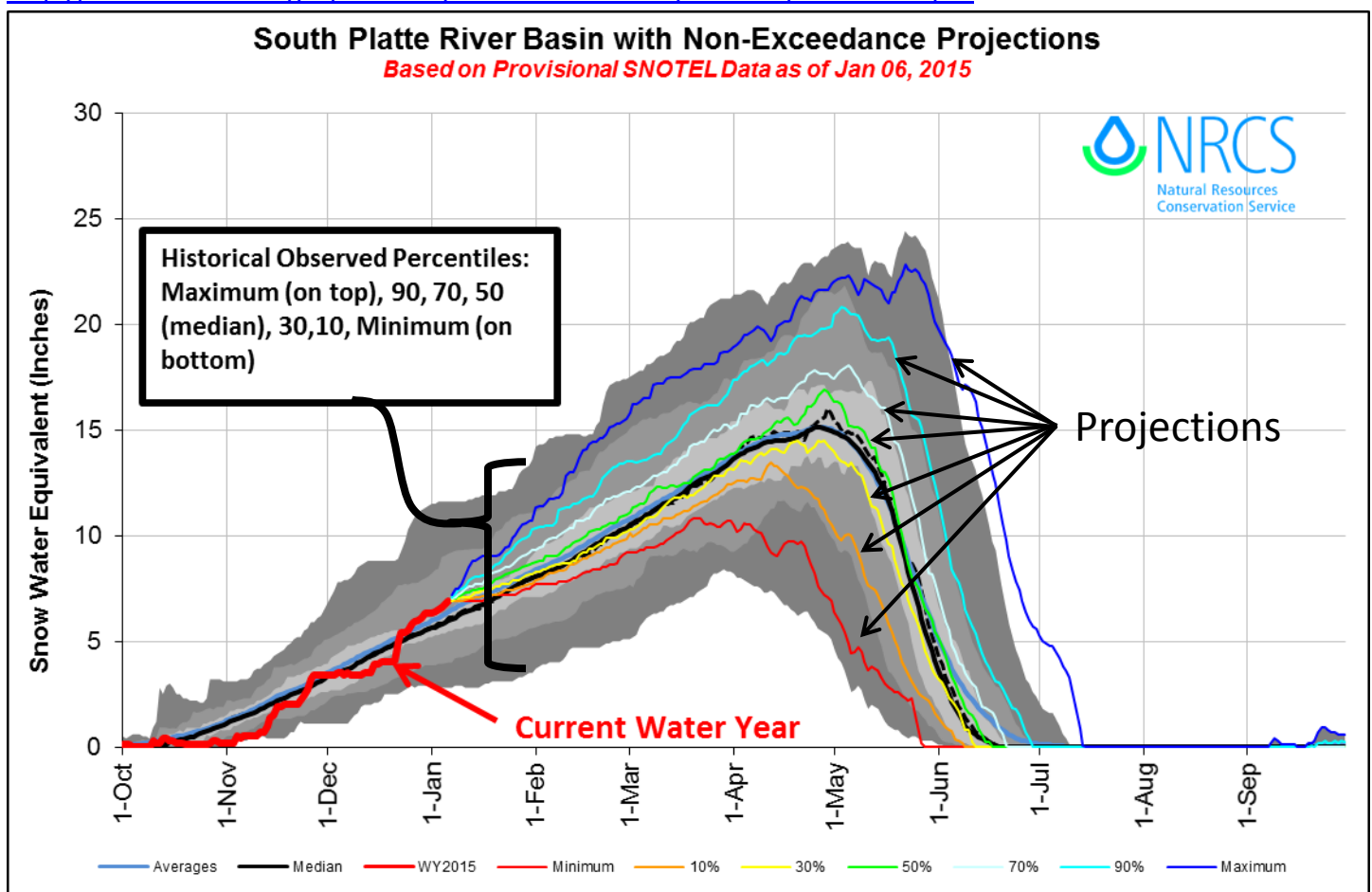
Current water year is represented by the heavy red line terminating on the last day the graphic was updated.

Historical observed percentile range is shown as a gray background area on the graph. Shades of gray indicate maximum, 90 percentile, 70 percentile, 50 percentile (solid black line), 30 percentile, 10 percentile, and minimum for the period of record.

Projections for maximum, 90 percent, 70 percent, 50 percent (most probabilistic snowpack projection, based on median), 30 percent, 10 percent, and minimum exceedances are projected forward from the end of the current line as different colored lines.

For more detailed information on these graphs visit:

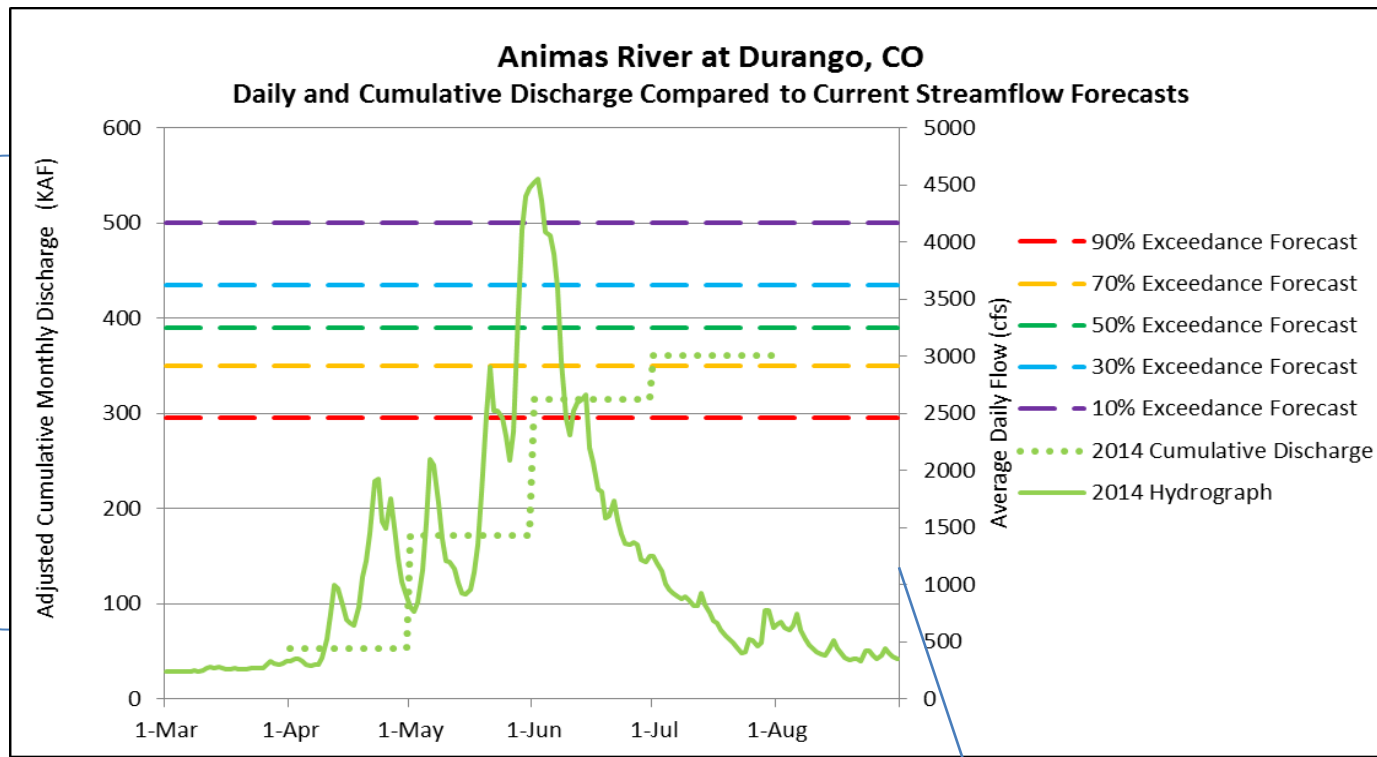
http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs144p2_062291.pdf



Explanation of Flow Comparison Charts

The flow comparison charts were developed to provide a quick comparison between the previous years' observed hydrograph, cumulative seasonal discharge, the current streamflow forecasts, and the current years' observed discharge (both hydrograph and cumulative discharge, as the season progresses). Forecast points for these products were generally chosen to be lower in the basin to best represent the basin-wide streamflow response for the season; the true degree of representativeness will vary between basins. When making comparisons of how the shape of the hydrograph relates to the monthly (and seasonal) cumulative discharges it is important to note that the hydrograph represents observed daily flows at the forecast point while the cumulative values may be adjusted for changes in reservoir storage and diversions to best represent what would be "natural flows" if these impoundments and diversions did not exist. This product can provide additional guidance regarding how to most wisely utilize the five exceedance forecasts based on past observations, current trends, and future uncertainty for a wide variety of purposes and water users.

The left y-axis represents values of adjusted cumulative discharge (KAF). This axis is to be used for comparing the current and previous years to the current five volumetric seasonal exceedance forecasts. This graphic only displays the previous years data but data for the current water year will be added as the season progresses.



The legend displays the symbology and color schemes for the various parameters represented. Exceedance forecasts represent total cumulative discharge for the April through July time period with the exception of the Rio Grande at Wagon Wheel Gap (Apr-Sep).

The right y-axis represents observed daily average discharge at the forecast point of interest. This graphic only displays the previous years data but data for the current water year will be added as the Season progresses.

How Forecasts Are Made

For more water supply and resource management information, contact:

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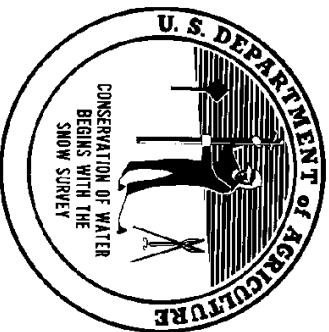
Phone (720) 544-2852

Website: <http://www.nrcs.usda.gov/wps/portal/nrcs/main/co/snow/>

Most of the annual streamflow in the western United States originates as snowfall that has accumulated in the mountains during the winter and early spring. As the snowpack accumulates, hydrologists estimate the runoff that will occur when it melts. Measurements of snow water equivalent at selected manual snow courses and automated SNOTEL sites, along with precipitation, antecedent streamflow, and indices of the El Niño / Southern Oscillation are used in computerized statistical and simulation models to prepare runoff forecasts. Unless otherwise specified, all forecasts are for flows that would occur naturally without any upstream influences.

Forecasts of any kind, of course, are not perfect. Streamflow forecast uncertainty arises from three primary sources: (1) uncertain knowledge of future weather conditions, (2) uncertainty in the forecasting procedure, and (3) errors in the data. The forecast, therefore, must be interpreted not as a single value but rather as a range of values with specific probabilities of occurrence. The middle of the range is expressed by the 50% exceedance probability forecast, for which there is a 50% chance that the actual flow will be above, and a 50% chance that the actual flow will be below, this value. To describe the expected range around this 50% value, four other forecasts are provided, two smaller values (90% and 70% exceedance probability) and two larger values (30%, and 10% exceedance probability). For example, there is a 90% chance that the actual flow will be more than the 90% exceedance probability forecast. The others can be interpreted similarly.

The wider the spread among these values, the more uncertain the forecast. As the season progresses, forecasts become more accurate, primarily because a greater portion of the future weather conditions become known; this is reflected by a narrowing of the range around the 50% exceedance probability forecast. Users should take this uncertainty into consideration when making operational decisions by selecting forecasts corresponding to the level of risk they are willing to assume about the amount of water to be expected. If users anticipate receiving a lesser supply of water, or if they wish to increase their chances of having an adequate supply of water for their operations, they may want to base their decisions on the 90% or 70% exceedance probability forecasts, or something in between. On the other hand, if users are concerned about receiving too much water (for example, threat of flooding), they may want to base their decisions on the 30% or 10% exceedance probability forecasts, or something in between. Regardless of the forecast value users choose for operations, they should be prepared to deal with either more or less water. (Users should remember that even if the 90% exceedance probability forecast is used, there is still a 10% chance of receiving less than this amount.) By using the exceedance probability information, users can easily determine the chances of receiving more or less water.



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In addition to the water supply outlook reports, water supply forecast information for the Western United States is available from the Natural Resources Conservation Service and the National Weather Service monthly, January through June. The information may be obtained from the Natural Resources Conservation Service web page at <http://www.wcc.nrcs.usda.gov/wsf/westwide.html>

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Water Supply Outlook Report

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